THE BRICKBUILDER

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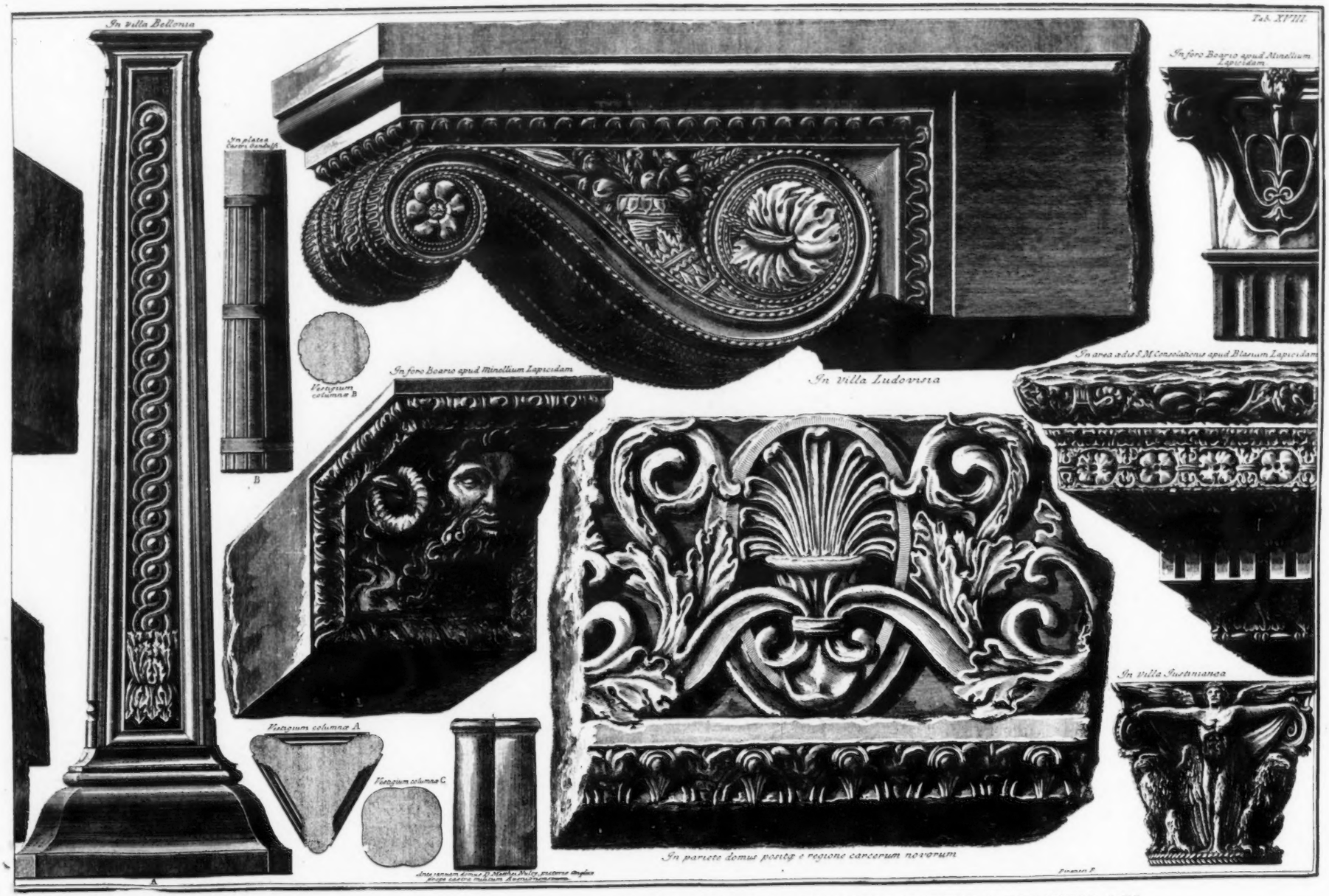
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In pariete domus postic. e regione carcerum novorum
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ARCHITECTURAL DETAILS FROM ANCIENT ROMAN BUILDINGS. GIOVANNI BATTISTA PIRANESI, DEL.

THE BRICKBVILDER

VOL. 18 NO. 8 DEVOTED TO THE INTERESTS OF ARCHITECTVRE IN MATERIALS OF CLAY AUGUST 1909

Interesting Examples of the Use of Burnt Clay in Architecture.

BY CHARLES H. HUGHES.

THE use of clay products for covering steel columns and girders for walls of subway stations and trolley car shelters on the Queensboro Bridge connecting New York and Long Island City, and on the Williamsburg Bridge connecting New York and Brooklyn, admirably illustrates their adaptability for practical and for ornamental purposes.

The Queensboro Bridge is of the cantilever type, with five spans, one of which is 1,182 feet and forms the longest span on any cantilever bridge in America.

The illustration shows the colonnade beneath the bridge, on the New York side of the river. The steel columns supporting the floor of the approach to the bridge rest on large granite bases and are covered with glazed terra cotta blocks, from the top of which springs the vaulting.

SHELTER, APPROACH TO WILLIAMSBURG BRIDGE, NEW YORK CITY.
Palmer & Hornbostel, Architects.

The vaulting is built of two or more layers of burnt clay tiles, the inner courses being laid in Portland cement mortar. The finish course is of cream-white tiles with corrugated glazed faces, laid in lime mortar; the joints are then raked out and given raised joints, the pointing mixture being lime gauzed with Keene's white cement. Before the tile construction was started, the arching of the approach was waterproofed on the under side with two good mop coats of coal tar pitch applied hot.

By referring to the illustration it will be seen that in the ribs between the columns the tiles have the same width as the faces of the glazed terra cotta blocks on the columns; also that the courses of tiles on each side break joints with those of the center. Note particularly how nicely the terra cotta blocks at the top of the columns fit into the vaulting between the ribs. Looking at the ribs transversely, it will be seen that they are made of four layers of tiles—the fourth one however does not extend the full width of the rib. Nearly 50,000 square feet of tile is used in the colonnades.

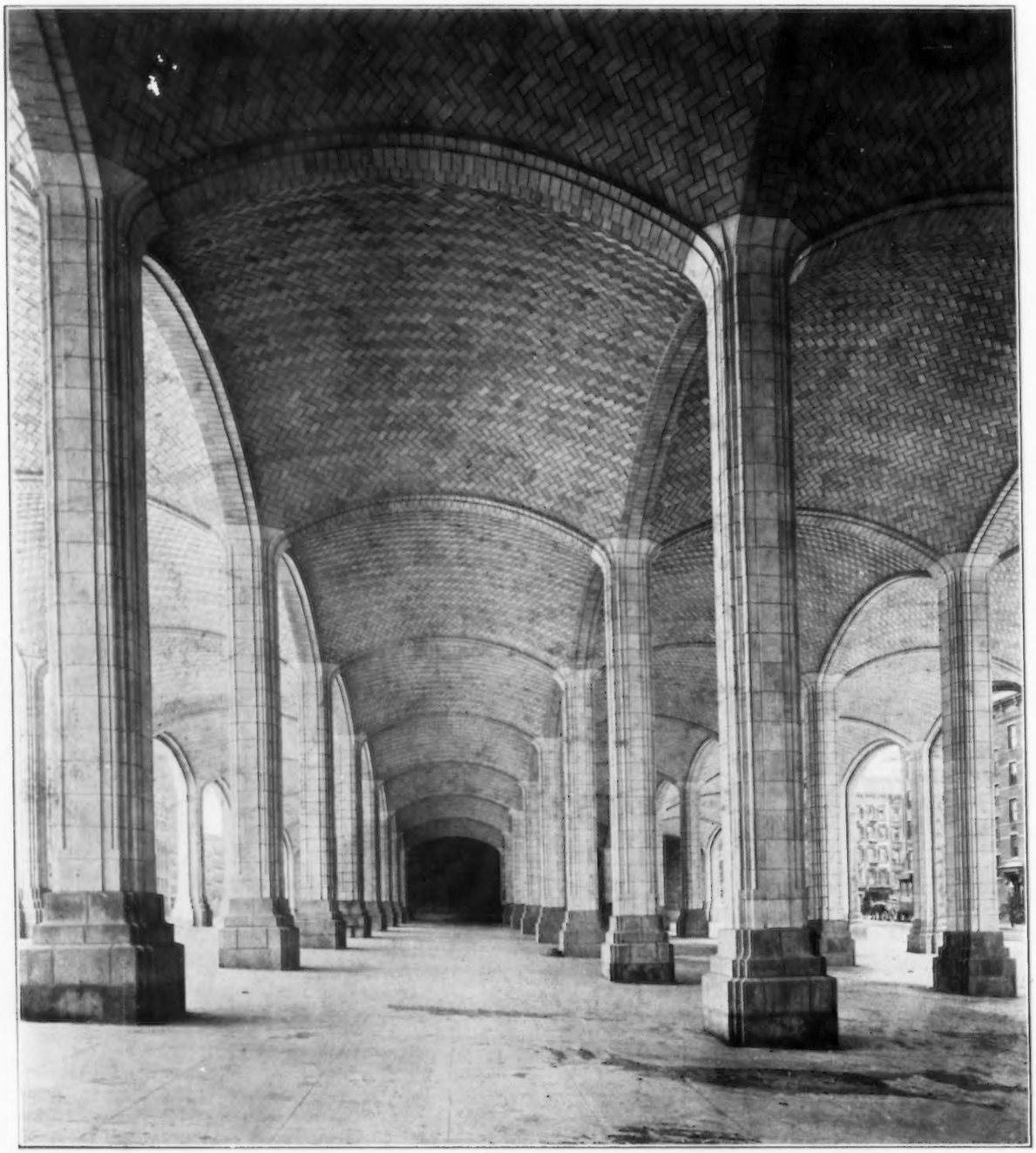
The vaulting in the arch over First avenue is another example of this construction, with a greater span than in the colonnades. Here the arch has a span of about 60 feet. The tiles are the same color and size as in the colonnades, and cover an area of almost 10,000 square feet.

By using light colored tiles and terra cotta blocks a bright, cheerful appearance is given to the soffit of the approach, which would otherwise be dark and dismal. In the soffit of the large arch are several electric lights as well as in the colonnade arches.

Owing to local conditions the Long Island City approach is built with solid granite side walls, and the steel columns and girders are not treated as on the New York side.

The timbrel and terra cotta work in the Williamsburg Bridge, while similar in a general way to that in Queensboro, has however many different features.

In the center of the approach to the bridge on the street level are trolley car shelters. Within the shelters will be noticed entrances and exits to the station below the street. The roof of the shelter is supported by cast-iron columns, which have collars to receive the vaulting. The vaulted surfaces are of burnt clay tile 6 inches by 12 inches by 1 inch, with the lower course of cream-white glazed corrugated tile, making a finished surface similar to that under the New York approach of the Queensboro Bridge, but the most pronounced difference is in the arched ribs, extending from column to column and from the columns to the roof cornices. Referring to the illustration it will be seen that the transverse ribs are made



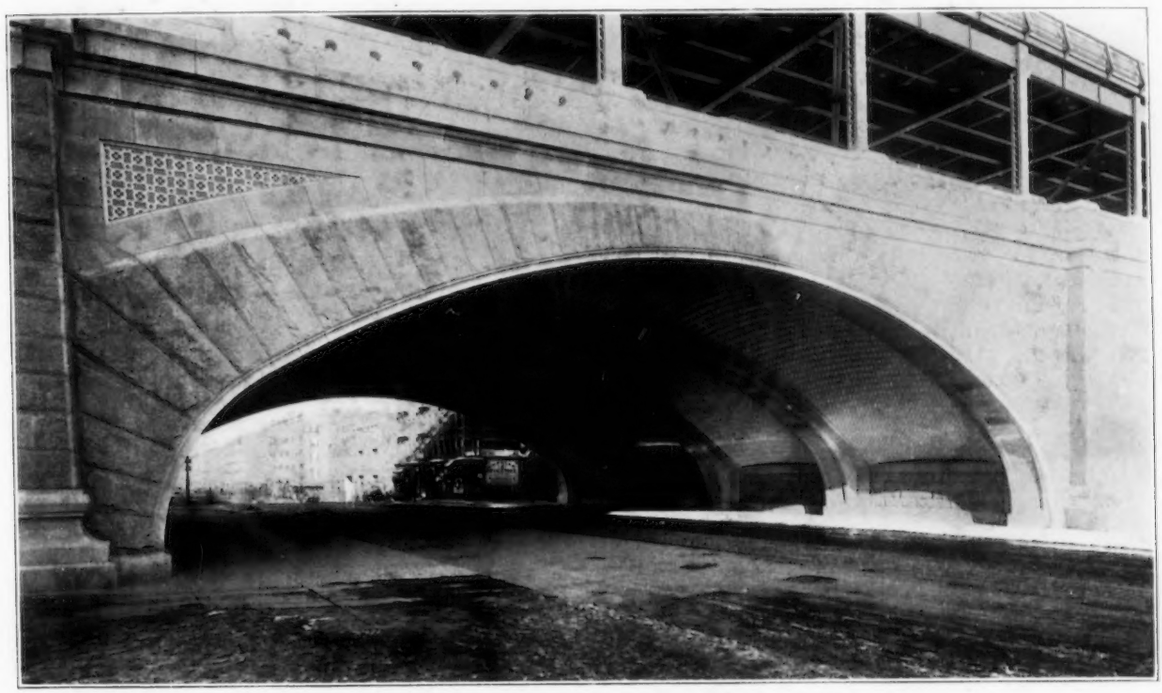
COLONNADE BENEATH APPROACH TO QUEENSBORO BRIDGE, NEW YORK CITY.
Palmer & Hornbostel, Architects.

up of two layers of tiles — that a tile the full width of the rib is always placed next to the column, and that the joints of the inner layer of tiles come directly over the center of the outer ones. The longitudinal ribs are also of two layers of tiles, which break joints. To secure a good bearing surface for the four ribs they are brought together about 12 inches above the top of the cast-iron columns.

One of the largest and most important of the new buildings in the Zoological Park, Borough of The Bronx, New York, is the Elephant House. It is one story high and in the center is a large polychrome dome. The walls of the house are of brick, with the outer face covered with buff Indiana limestone, and the inner face, where exposed as in the animal quarters, walls of keeper's rooms, etc., covered with Norman-shaped, mottled-faced brick laid in colored mortar with $\frac{3}{16}$ inch shove joints.

The dome has an exterior diameter of about 40 feet, with the base 48 feet above the ground and the top of the lantern 74 feet. It is the largest polychrome dome in this country and is similar to those on many of the old Mexican churches. The dome is built of rough tiles sufficiently thick to carry the weight of the lantern and furnish a support for the colored glazed tiling. The border tiles adjacent to the ribs are purple, the lowest band is a grayish blue, the next strong blue, then cream, and finally green. Above the green band is the panel leaf ornamentation, with a yellow background and blue leaves. Following the leaf ornamentation are more bands, similar in colors to the first, with another leaf ornamentation, and finally more bands corresponding to the lower ones. The dome has eight yellow ribs, and at the bases are ornamental finials in yellow and green. On top of the dome is the lantern, about 15 feet high and 5 feet in diameter, of polychrome terra cotta, with eight blue rectangular panels and eight small green ones near the top. Below the base of the dome is a frieze of yellow, blue, and white terra cotta tile, which stands out prominently against the buff limestone. With the sun shining the color effect is very striking.

Under the polychrome dome is another. This second one, forming the ceiling of the rotunda, is perforated by twelve ceiling lights 4 feet in diameter and one center light about 5 feet in diameter, through which light passes to the floor below. The tiles for the vaulting are semi-porous terra cotta 1 inch by 6 inches by 12 inches, and are laid in Portland cement mortar. A row of tiles follows the arches, and above them are bands encircling the rotunda, except where broken by the arches. The tiles forming the bands are of a lighter shade than those in the vaulting. The arches on the four sides of the rotunda have the bricks set radially, and above those over the center bay, the usual wall construction is followed to the roof. The walls of the rotunda are of limestone.



ARCH SPANNING FIRST AVENUE, QUEENSBORO BRIDGE, NEW YORK CITY.

On each side of the rotunda are three bays, the end one being semi-circular. The arches over the center bay have the bricks laid row-lock, and finished off on the under side with five thicknesses of tiles laid in the herring-bone pattern, the tiles breaking joints. The arches are built to the roof, and are continued transversely on both sides of the center bay as solid walls to the walls of the house, thus forming enclosures for the animals. The longitudinal arches are of five courses of radial brick, and above them the ordinary brick wall. In the soffits

are five layers of tiles, laid with broken joints similar to those in the transfer arches.

The ceilings over all the bays are of tiles, 1 inch by 6 inches by 12 inches, the same as in the rotunda, and around the end bays are two light bands of tiles.

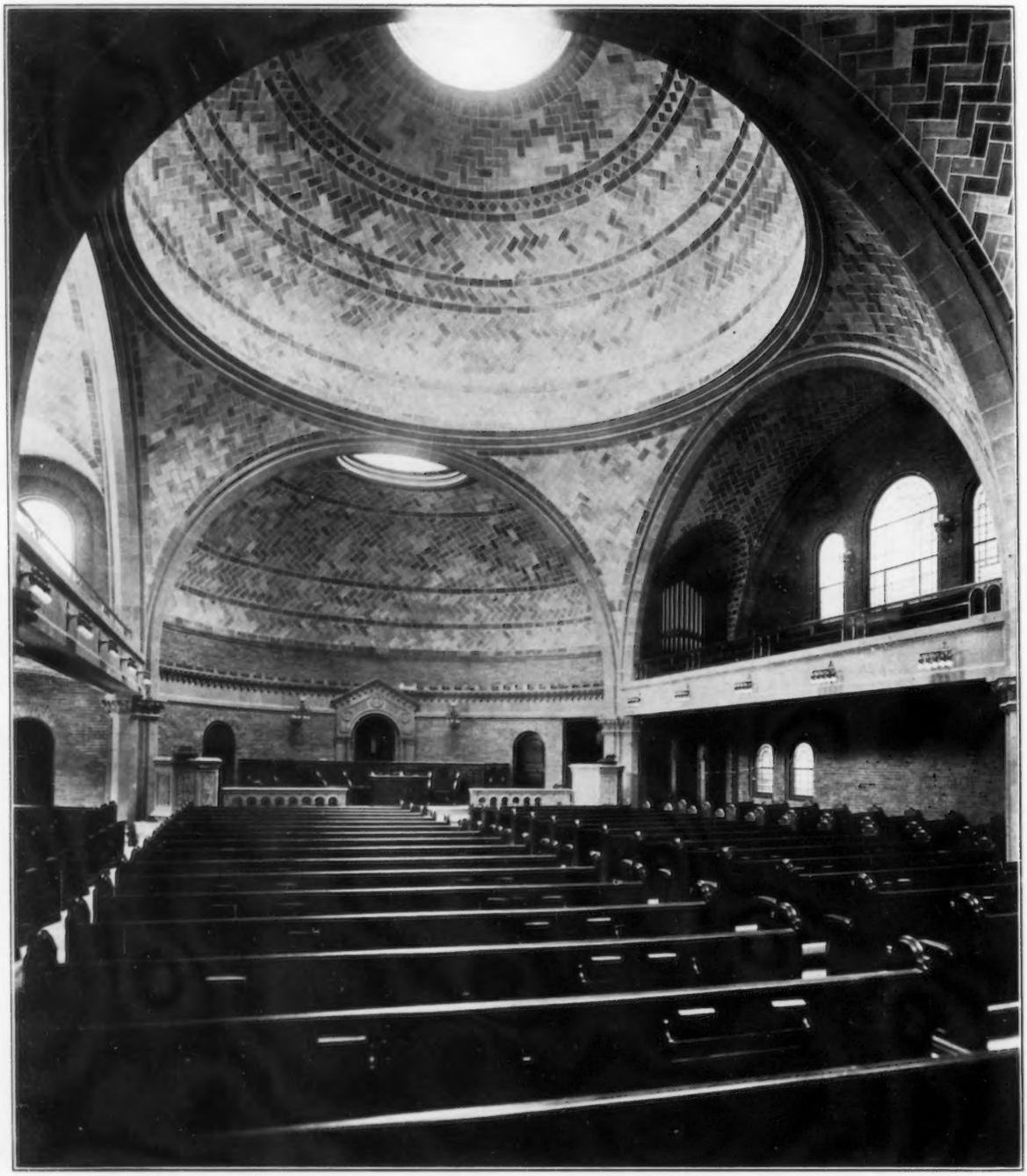
The interior of the house is well lighted and ventilated. Besides the rotunda lights there are windows in the walls above the arches and ventilators in the vaulting over the center bay. In the vaulting over the side bays are large rectangular skylights, while in each end bay are three windows.

The colors in the pitched roof are a decided contrast to those in the polychrome dome and to the buff limestone walls. The roof is covered with green glazed tiles set in panels with buff colored terra cotta ribs matching the limestone. There are three ribs forming four panels on each side of the dome, and then a limestone rib forming a gable, which marks the end of the straight portion of the house. The semi-circular ends have three buff terra cotta ribs, between which are laid green tiles.

Another excellent example of the use of tile vaulting in connection with architectural terra cotta is found in the Amety Baptist Church, New York City. The illustration shows how gracefully terra cotta and tiling can be joined to decorate even the most intricate structural problems. Of considerable interest are the penetrations of the soffits in the gallery arches which generally have a tendency to detract from the harmony of the whole structure, but are so finely executed in this church as to add to the interest of the entire scheme. The chancel rail and pulpits are constructed of architectural terra cotta.

DOME OF ELEPHANT HOUSE, ZOOLOGICAL PARK, NEW YORK CITY.
Heins & La Farge, Architects.

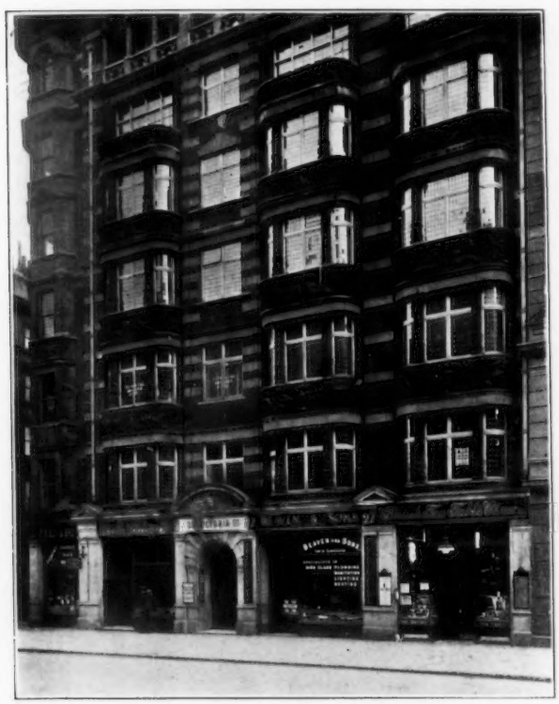
ROTUNDA AND BAYS, ELEPHANT HOUSE, ZOOLOGICAL PARK, NEW YORK CITY.
Heins & La Farge, Architects.



INTERIOR, AMETY BAPTIST CHURCH, 312 WEST 54TH STREET, NEW YORK CITY.
Rossiter & Wright, Architects.

Carved Brickwork — Some English Examples.

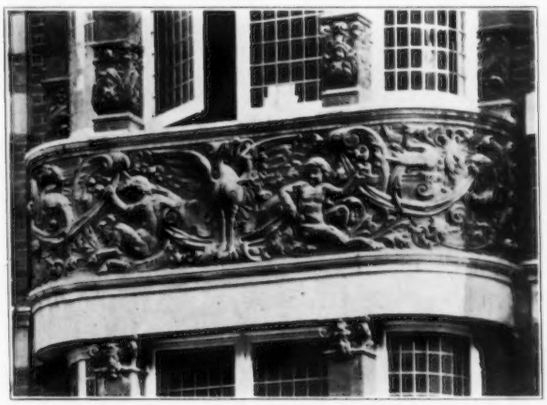
EVER since our houses were bespattered with stucco — surely the most baneful architectural disease we have yet suffered — the introduction of carved stonework on all classes of houses has been general. The most ignorant jerry-builder, throwing up his brick boxes on the fields of our suburbs, has always had paramount in his mind the necessity for some foliated stone capitals on either side of the entrance doorway, and on the little bay window with its harsh slate roof and Gothic finial. It is not good carving ; it is ill-devised, proportionless, coarse, and it sets on the house like fungus on a tree. Perhaps



BUSINESS PREMISES, VICTORIA STREET, LONDON.
Showing bays with carved brick treatment.

the builder, in his ignorance, is the better judge of the taste, or want of taste, displayed by his prospective clients, and as he buys his carved stone trimmings from the mason's yard at so much per dozen, or gets them hewn in place into such shape as they possess, it is hopeless to ask for something else. But with the better class house, intended for people who are supposed to have a fitter sense of things, with at least some appreciation of appropriate work, one is surprised to find so little in the way of carved brickwork, for such work has a peculiar charm on a brick house, and no great expense need be incurred in the execution of it.

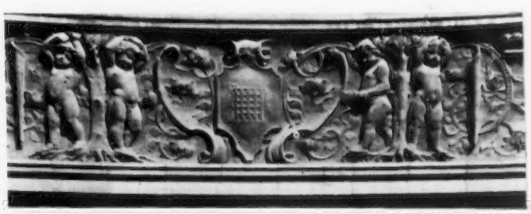
Provided that the proper grade is secured, brick is a pleasant material to carve, and there is a softness about its outline which is peculiarly distinctive. Moreover, in the matter of weathering, carved brick is pleasing ; for,



CARVED BRICK PANEL, BUSINESS PREMISES, VICTORIA STREET, LONDON.

when forming the enrichment of a brick building, it mellows equally as the rest of the surface, yet preserving the crispness of relief which is wanted. Stonework on the contrary — especially light stonework — weathers independently, and so it appears as more or less of patchwork on a brick building ; and not infrequently it streaks the brick, or is streaked by it.

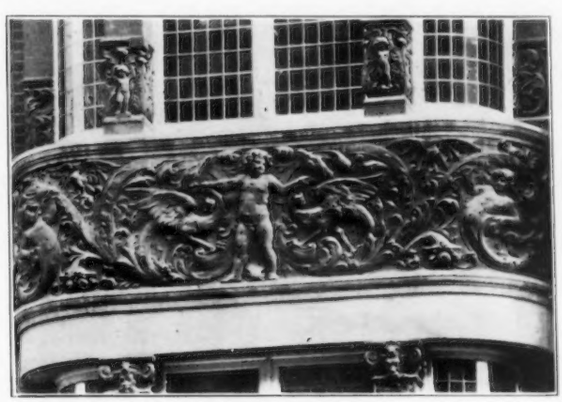
It might be thought that not sufficient contrast was gained by the use of brick carving on a brick building,



CARVED BRICK PANEL, VICTORIA STREET, LONDON.

and, in a measure, with bricks of uniform color, this is true. Where, however, as is usual, "rubber" bricks are used for the carved work and ordinary red bricks for the general walling, the slight difference in tint at once secures that variety of effect which is desirable.

Carved brickwork on a brick building seems to grow



CARVED BRICK PANEL, BUSINESS PREMISES, VICTORIA STREET, LONDON.

out of the surface instead of giving the appearance of being stuck on.

The accompanying illustrations of some examples in London serve to illustrate the possibilities of carved brickwork. It will be noticed what fine detail can be executed in the material.

CARVED BRICK FRIEZE, DE VERE HOTEL, LONDON.

The building in Victoria street is an excellent example of its use as a beautiful enrichment to a series of large bay windows. The carving here is executed with great care. Carried out so elaborately, it was, of course, an expensive item, but the excellent way in which it has withstood the London atmosphere proves its worth. Still more convincing in this respect is the carved brickwork to the doorways in King's Bench Walk, as this work dates from the Wren period, yet still retains its sharpness. In the frieze to the De Vere Hotel at Hyde Park Gate a much coarser treatment is apparent, and one which is not so commendable, for this frieze is close to the eye, being only about ten feet above the pavement, and in the endeavor to secure what passes for "breadth of effect" the carver has gone astray, and his fanciful little figures of squirrels and dogs that follow through the frieze are rather lost in the general heavy effect.

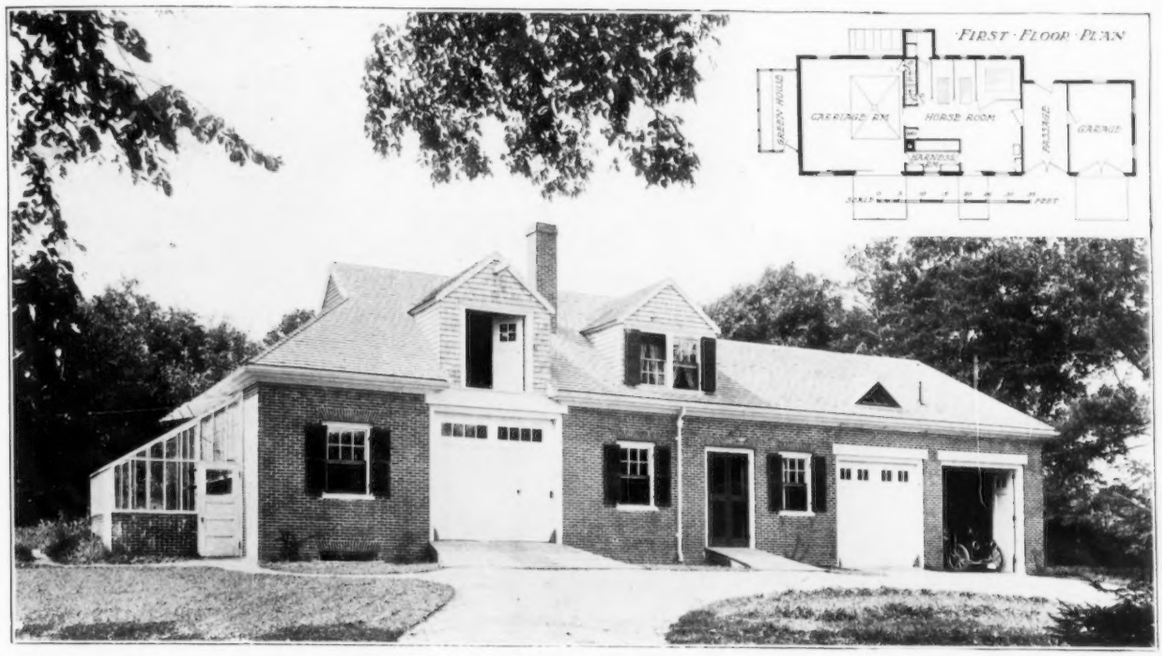
CARVED BRICK PANEL, APARTMENT HOUSE, LONDON.

As a carved brick panel, the example on the block of shops and flats in Knightsbridge is a good one, delicate in outline and well designed in the manner of English renaissance detail. When we call to mind the average stone panel that is put on our buildings, the merit of this brick detail is clearly evident. The carving on the house in Prince Consort road serves its purpose as illustrating the use of carved brick in domestic work.

Examples might be multiplied without number, but the foregoing suffice to illustrate the beautiful effect which can be secured by brick carving — blackening, may be, like all other material, in a city atmosphere, but preserving its texture in the purer air of the country, and acquiring its most beautiful appearance when, after long exposure, lichen spreads its soft veil over the surface and gives that touch of nature which adds the greatest charm to any building.

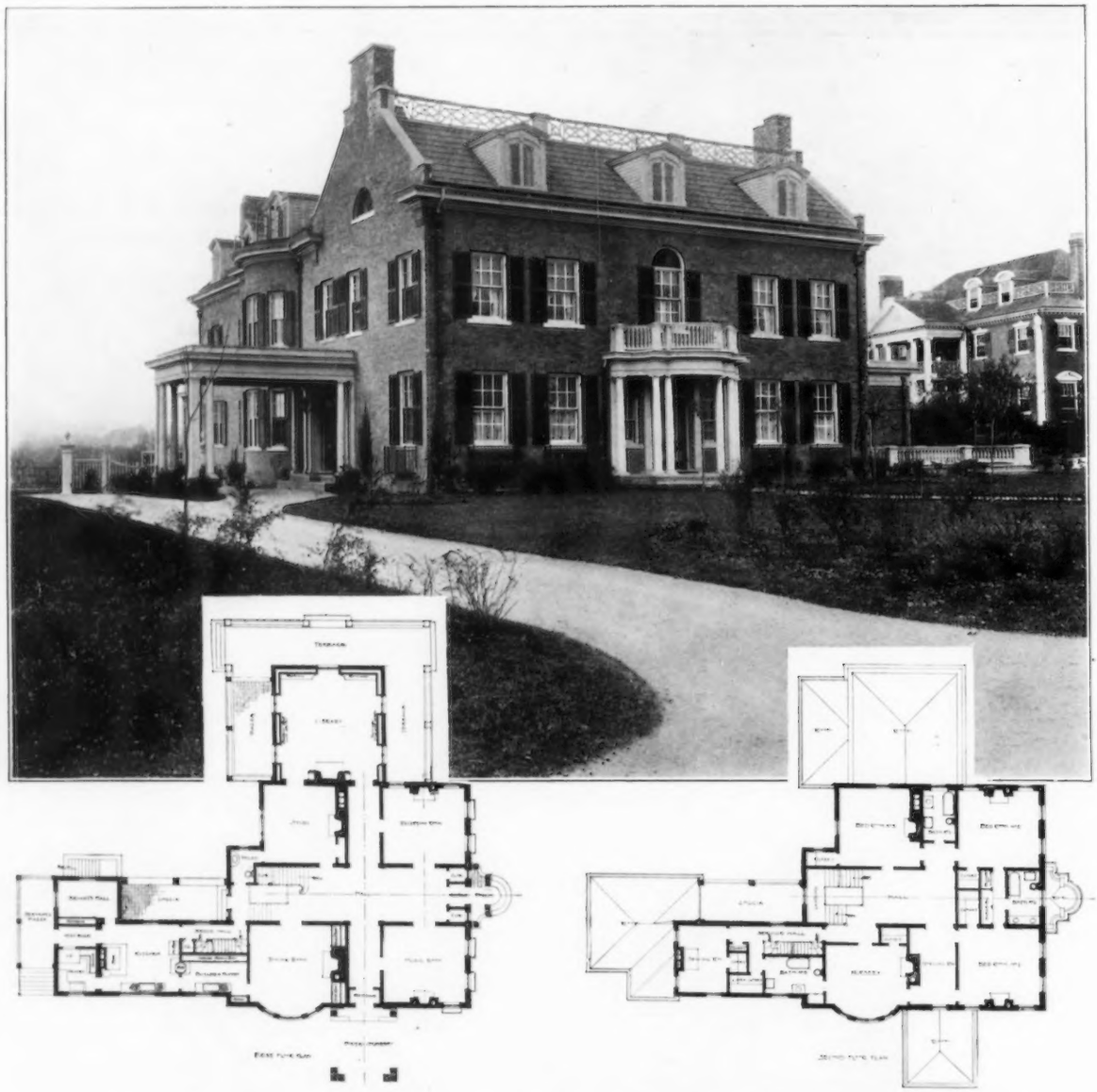
CARVED BRICK CAPITALS, DOORWAY IN KING'S BENCH WALK, LONDON.

CARVED BRICK ON HOUSE, PRINCE CONSORT ROAD, LONDON.



STABLE AND GARAGE.

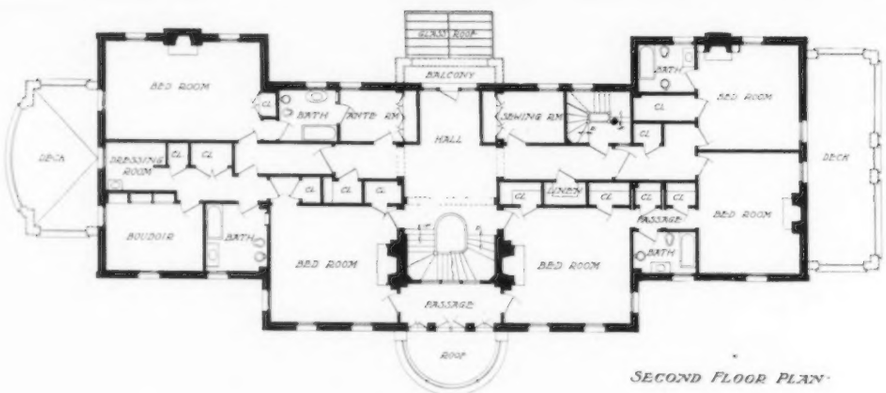
HOUSE AT MILTON, MASS.
F. E. Zerrahn and Stickney & Austin, Associated, Architects.



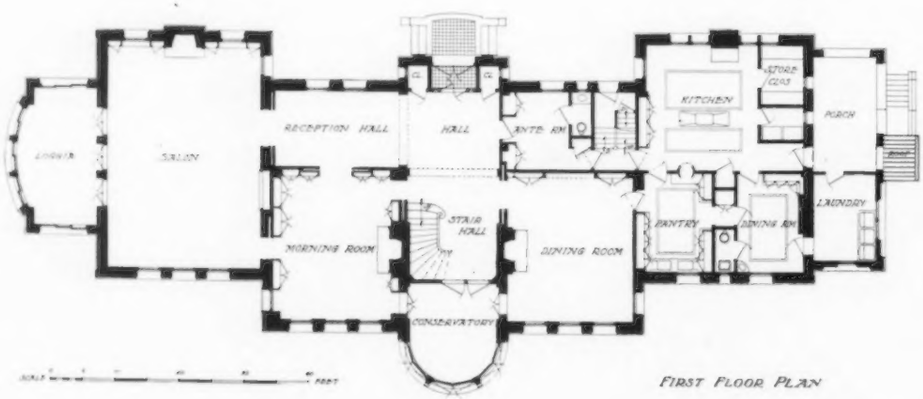
HOUSE AT CHESTNUT HILL, BROOKLINE, MASS.
Henry F. Keyes, Architect.

HOUSE AT LAKE FOREST, ILL.
ROBERT D. KOHN, ARCHITECT.

HOUSE AT
LAKE FOREST,
ILLINOIS.

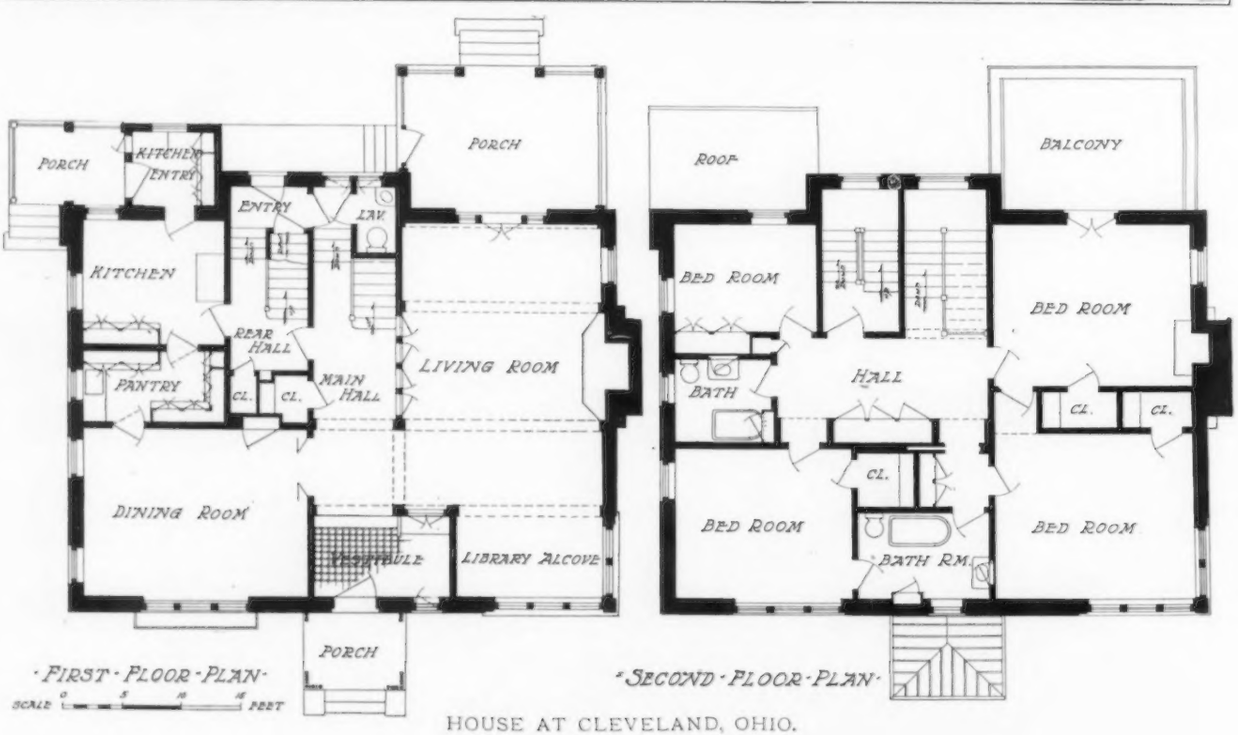


SECOND FLOOR PLAN.



FIRST FLOOR PLAN

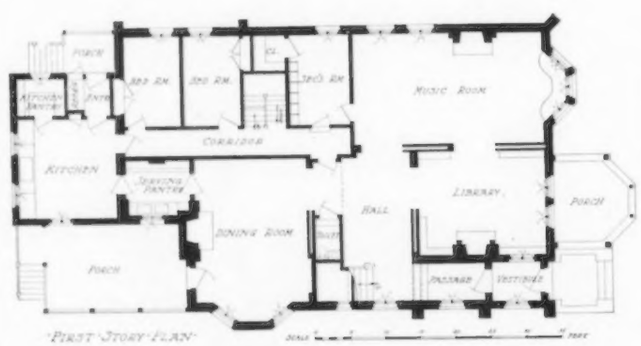
ROBERT D. KOHN,
ARCHITECT.



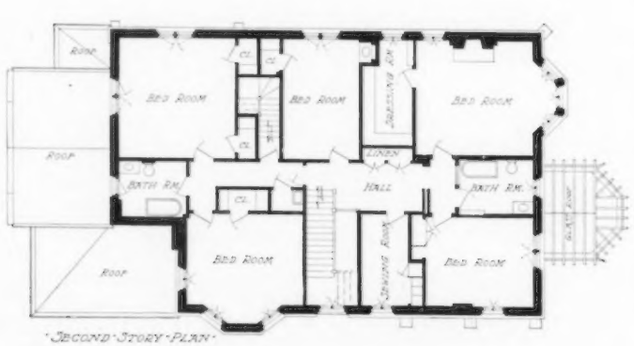
HOUSE AT CLEVELAND, OHIO.
WATTERSON & SCHNEIDER, ARCHITECTS.

UNIV. OF MICH.

HOUSE, WOODLAWN AVENUE, CHICAGO.
POND & POND, ARCHITECTS.



'FIRST STORY PLAN'



'SECOND STORY PLAN'

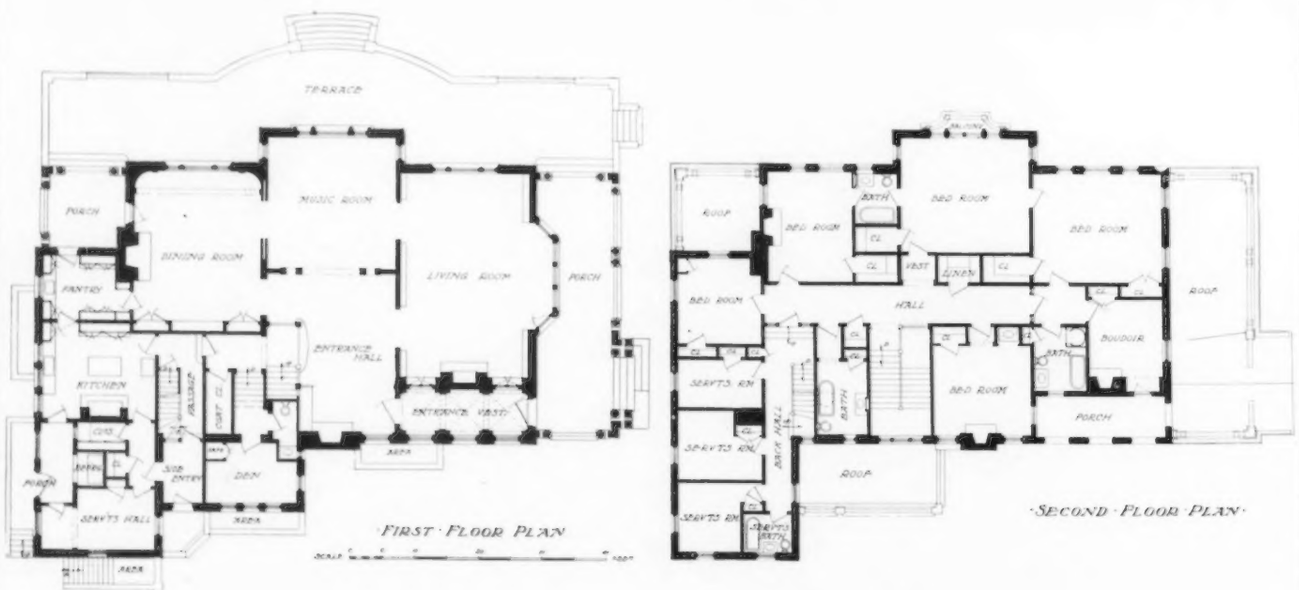
UNIV OF MICH

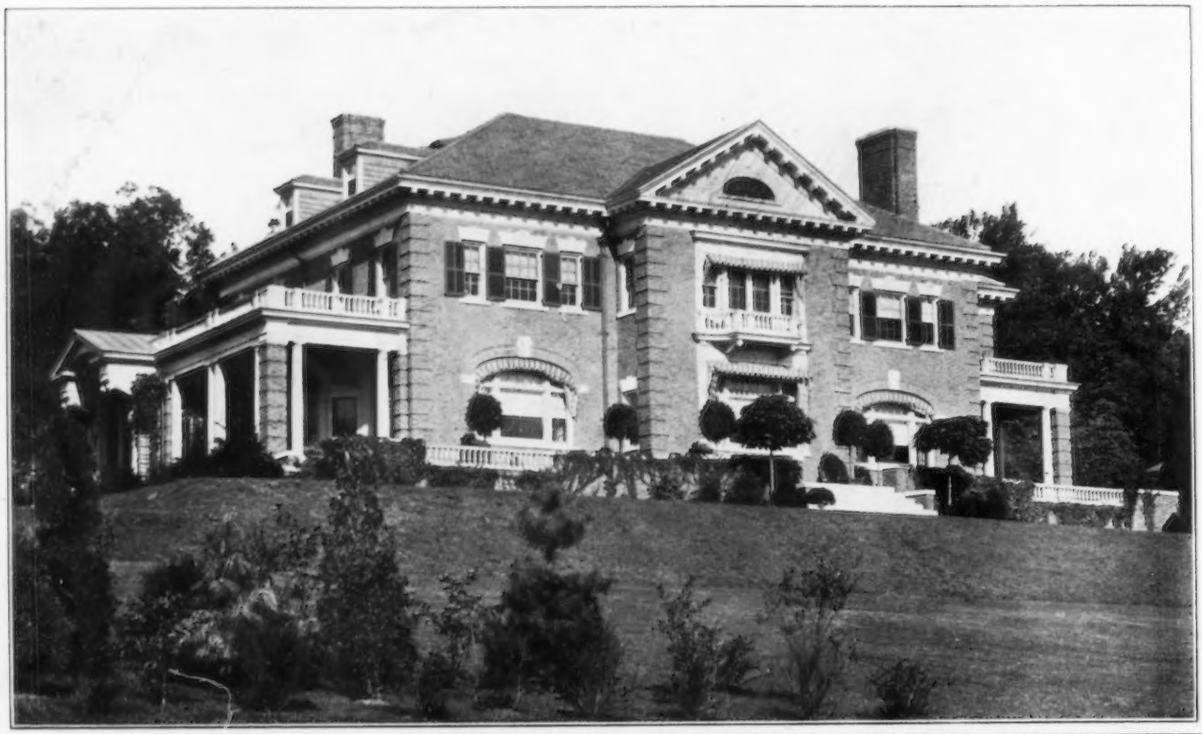
HOUSE FOR T. M. ARMSTRONG, ESQ., PITTSBURGH, PA.

ALDEN & HARLOW, ARCHITECTS.

HOUSE AT MONTCLAIR, N. J.

GROSVENOR ATTERBURY AND WALTER LESLIE WALKER, ASSOCIATED, ARCHITECTS.



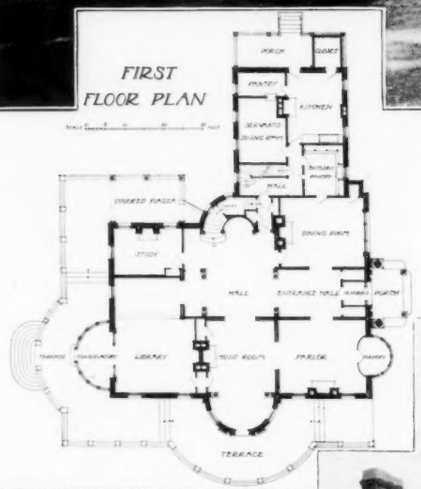


DINING ROOM.

HOUSE AT MONTCLAIR, N. J.

GROSVENOR ATTERBURY AND WALTER LESLIE WALKER, ASSOCIATED, ARCHITECTS

FIRST FLOOR PLAN



HOUSE AT MILTON, MASS.
WILLARD T. SEARS, ARCHITECT.

SECOND FLOOR PLAN

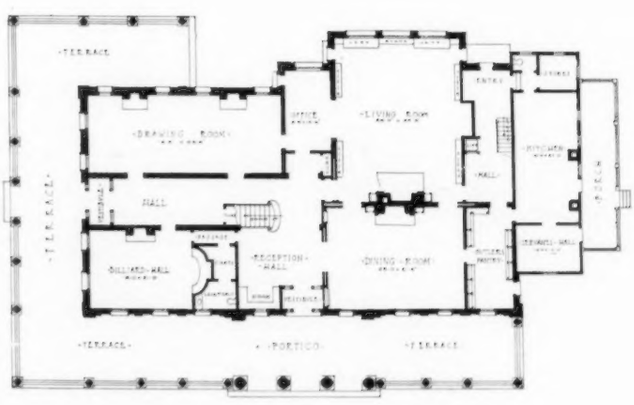
STABLE AND GARAGE.

THE GARDEN.

HOUSE AT MILTON, MASS.

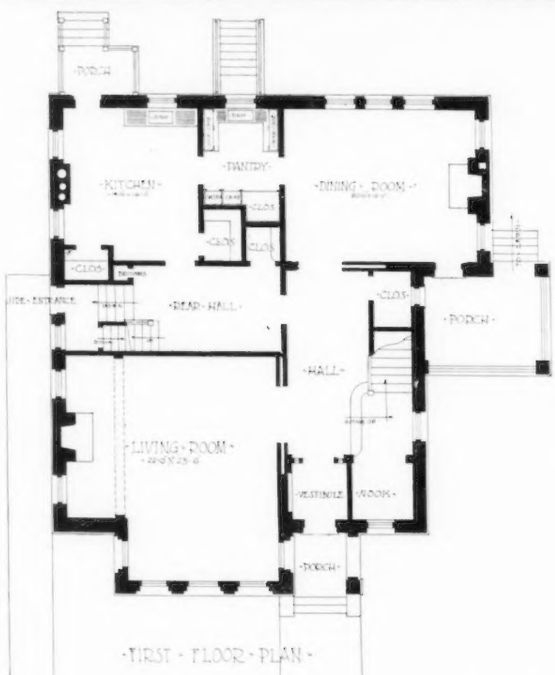
WILLARD T. SEARS, ARCHITECT

HOUSE AT CLARKSVILLE, MO.
MAURAN, RUSSELL & GARDEN, ARCHITECTS.



FIRST FLOOR PLAN

SECOND FLOOR PLAN



FIRST FLOOR PLAN.

SECOND FLOOR PLAN.

HOUSE, WESTMINSTER PLACE, ST LOUIS, MO.
MAURAN, RUSSELL & GARDEN, ARCHITECTS.

UNIV OF MICH

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WASHINGTON TERRACE,
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MAURAN, RUSSELL & GARDEN,
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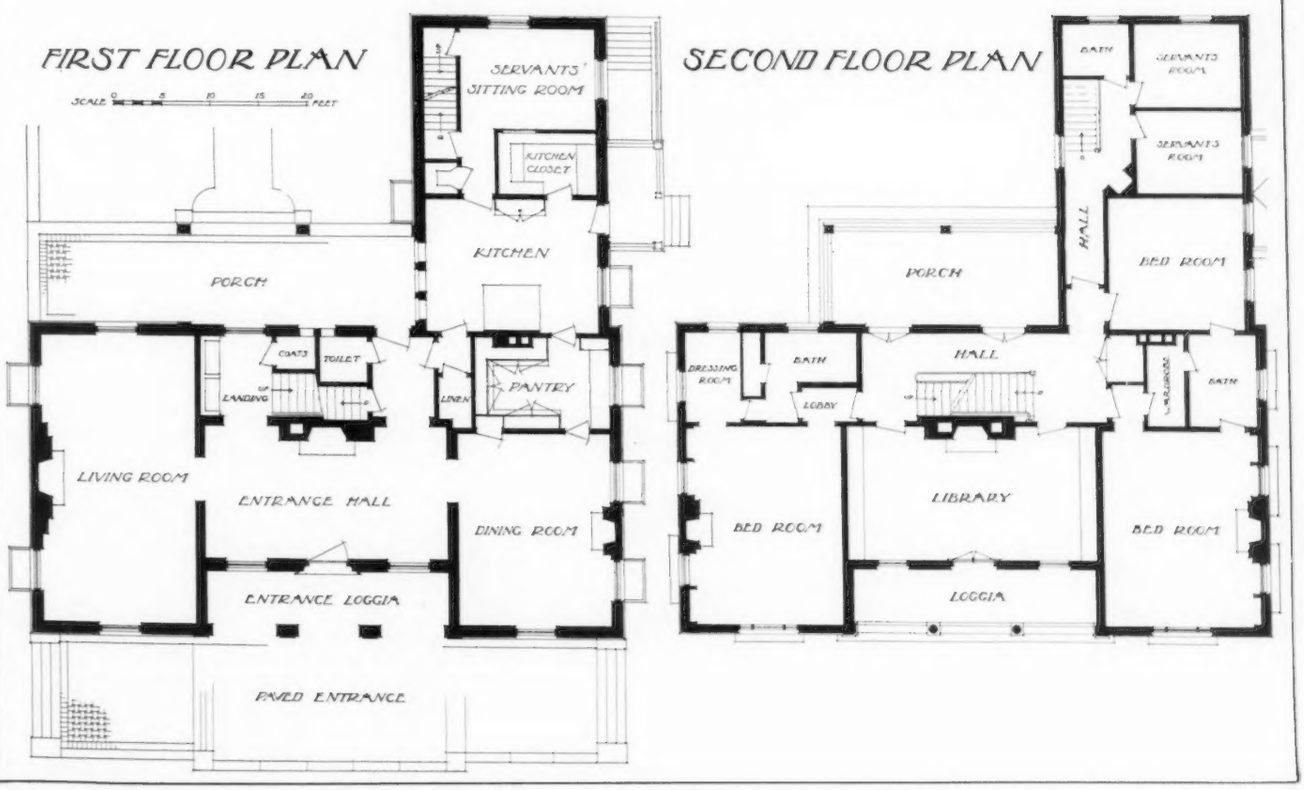
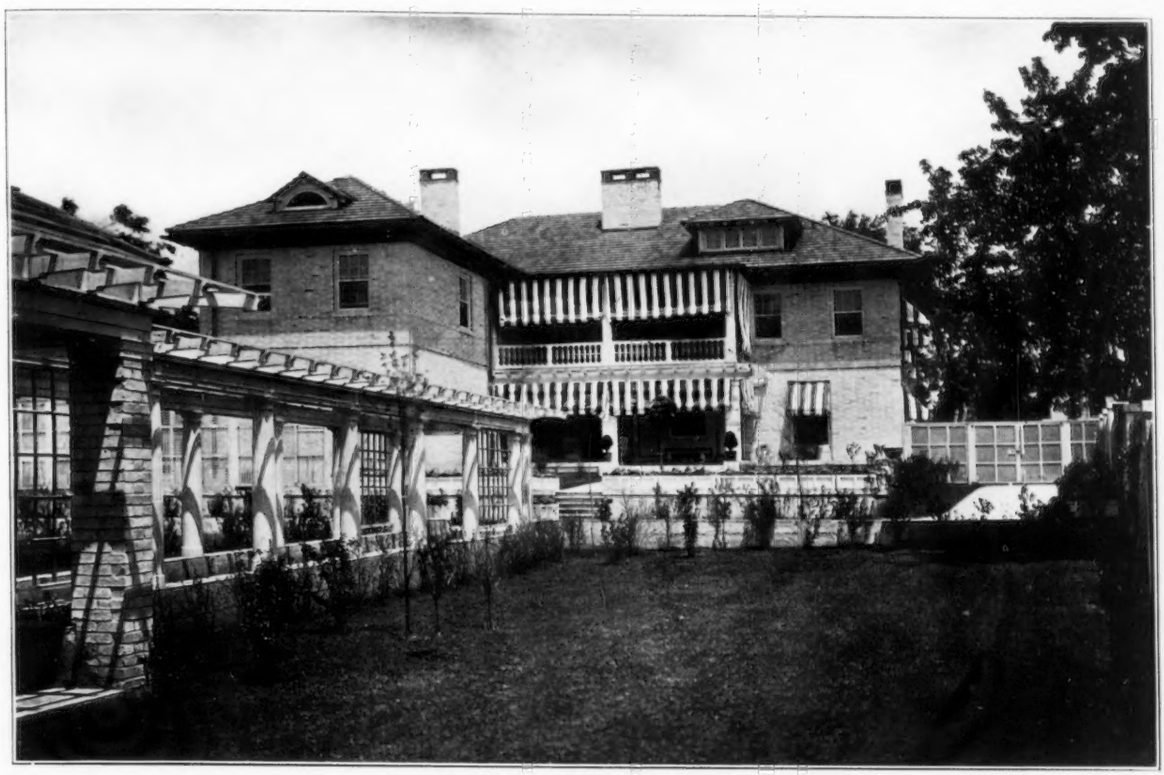
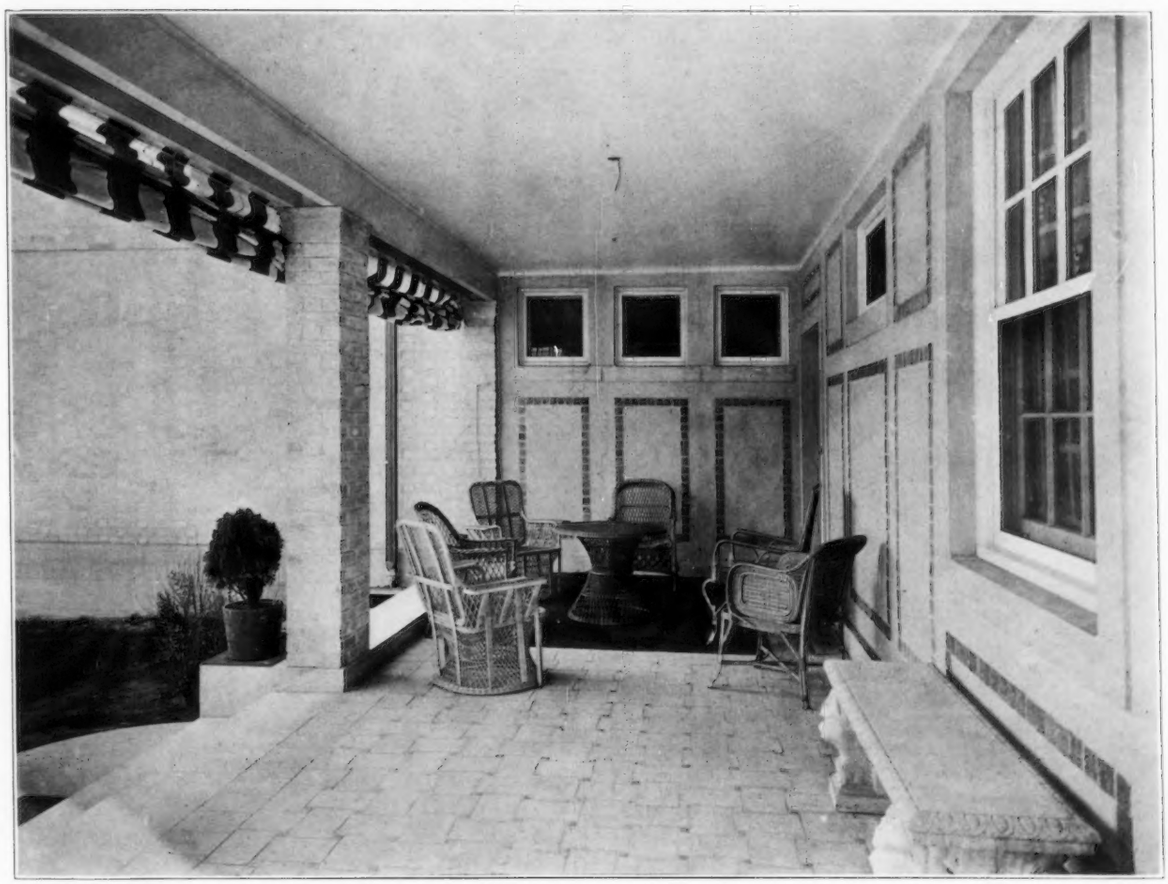
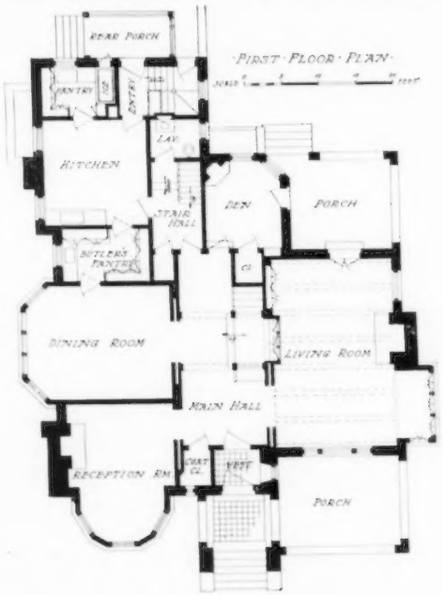


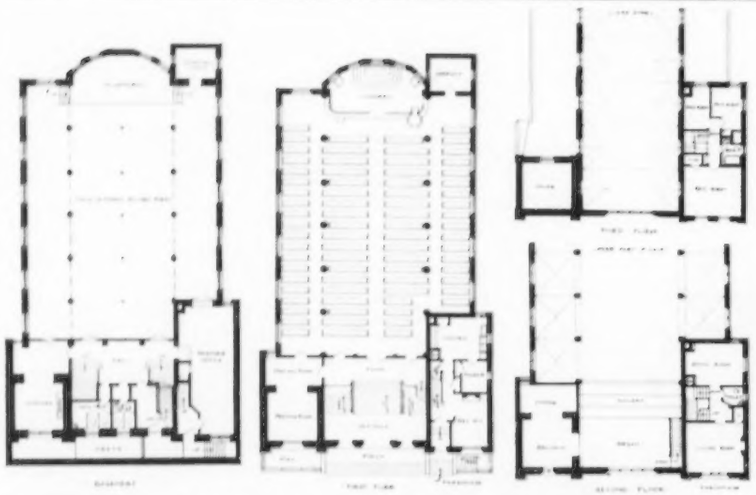


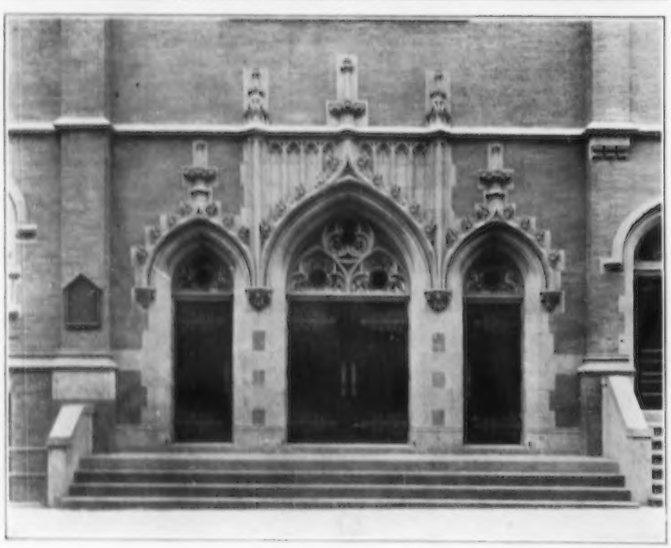
HOUSE AT HERKIMER, N. Y.
CHARLES C. GRANT, ARCHITECT.





HOUSE AT CLEVELAND, OHIO.
Watterson & Schneider, Architects.





GERMAN LUTHERAN CHURCH, 164 WEST 100TH STREET, NEW YORK CITY.
G. W. Conable, Architect.

Standard Architectural Books—VI.

SAMUEL PARSONS, JR.: Superintendent of Parks, New York City. Landscape Gardening: Notes and Suggestions on Lawns and Lawn Planting — laying out and arrangement of country places, large and small parks, cemetery plots, and railway station lawns — the hardy border — bedding plants — rock work, etc. New York, G. P. Putnam's Sons, 1891; 4to (.26 by .19 by .03); 22+329 p., ill.; cloth, $3.50. There are several books dealing with the practical side of gardening which we might recommend, but perhaps no one will be so useful as this by Mr. Parsons. He has little to say about questions of design, but much about effects to be secured by the different kinds of plants and their seasonable arrangement.

Charles Adams Platt: painter and architect. Italian Gardens. New York, Harper & Brothers, 1894; 4to (.275 by .201 by .02); 14+159 p., ill., 2 pl.; cloth, $5.00. Landscape gardening in this country was almost entirely according to the informal English scheme, until Mr. Platt's book called popular attention to the delightful possibilities of the formal type.

Inigo Triggs, A.R.I.B.A.: Godwin Bursar, Royal Institute of British Architects. The Art of Garden Design in Italy. London and New York, Longman, Green & Co. 1906; fol. (.445 by .355 by .065); 12+135 p., ill., seventy-three photographs by Mr. Aubrey le Blond; cloth, 73s. 6d. net. The study of Italian gardens, so well begun by Mr. Platt, has been followed by many. The modern literature of the subject is already considerable; but we must limit our selection. Triggs' book is an excellent treatise, full of plans, photographs, and explanatory sketches.

The Hon. Alicia Amherst (Mrs. Alicia Margaret Tusson-Amherst Cecil): A History of Gardening in England. London, Bernard Quaritch, second ed. 1896; 4to (.26 by .175 by .035); 14+405 p., ill., bibliography pp. 331-380; cloth, 18s. net. The English nation lives on its land. The garden is a part of the home, and has received attention in almost every period. A careful, sympathetic history of gardening in England, like this of Mrs. Cecil's, is really a good history of the art of gardening generally in Europe. It is especially interesting in the treatment of the earlier periods, the Monastic, Gothic, Renaissance, and Tudor.

Reginald Blomfield, M.A., A.R.A., F.S.A.: architect, Professor of Architecture in the Royal Academy; and F. Inigo Thomas. The Formal Garden in England. London and New York, Macmillan & Co., 1892; 12mo. (.2 by .14 by .025); 30+249 p., ill.; cloth, 7s. 6d. Technically the term *Jardin à l'Anglaise* stands, the world over, for the informal variety. As a matter of fact, however, the finest arrangements in England are formal, and belong to the classic period. Intelligent architects, like Sedding and Blomfield, have drawn attention to these as models for imitation. The result of this effort in England, as in this country, has been the conviction that the two kinds of work are equally important and may harmonize perfectly.

Guy Lowell, architect. American Gardens. Boston, Bates & Guild Co., 1902; small fol. (.315 by .26 by .04); not paged, 112 plates, plans in the index; cloth, $7.50. American architects in these later days have been deeply interested in the revival of the formal or Italian garden, and in its adaptation to the familiar informal type, and to the delicious wild country which abounds with us. Their successful results have been fully published in the journals. Of these Mr. Lowell has made a charming selection, illustrating not the most pretentious examples, but the most beautiful designs.

Josiah Conder, F.R.I.B.A.: Author of numerous works on Japan. Landscape Gardening in Japan. Tokio, Kelly & Walsh; London, Sampson Low, Marston & Co., 1893; small fol. (.37 by .275 by .03); 11 + 161 p., ill., 37 pl.; cloth, 52s. net. Supplement 1893; 72 p. 40 pl.; cloth, 36s. net. The sympathies of the American architect and his client are too broad to be confined by period or style. They have use for the "formal," the "informal," or the "natural" and delight in an occasional touch of the "Oriental." Conder's book is the standard work on Japanese gardens, very thorough and well illustrated.

Furniture.

Frederick Litchfield. Illustrated History of Furniture, from the earliest to the present time. London, Truslove; Boston, Estes & Lauriat, 1893; 4to (.28 by .20 by .04); 16 + 280 p., ill., 78 pl.; cloth, $10.00. American ed. 200 copies. There are several good histories of furniture. Jacquemart, Histoire du Mobilier, Paris, 1876; and Koeppen & Breuer, Geschichte des Moebels, New York, Hessling, 1904, may be mentioned; but Litchfield is quite the best for our list. It has long been recognized as the standard book, covering the entire field thoroughly.

Alvan Crocker Nye. Furniture Designing and Draughting; notes on the elementary forms, methods of construction and dimensions of common articles of furniture. New York, W. T. Comstock, 1900; 4to (.26 by .18 by .015); 100 p., ill., 22 pl.; cloth, $2.00. The late Mr. Nye did much for the cause of sound furniture designing in this country, not only by his actual practice, but also by his publications on the theory of his art. The book in hand gives the details of construction concisely, with beautifully drawn illustrations.

K. Warren Clouston. The Chippendale Period in English Furniture, with illustrations by the author. London, Debenham & Freebody; New York, Edward Arnold, 1897; 4to (.29 by .24 by .03); 16 + 224 p., ill.; cloth, 21s. net. This period has especial interest for us, as much of its furniture was brought to this country, and its character was perpetuated in our own colonial work. To select one from the many fine books on the subject is not easy, but, from a literary point of view, at least, Clouston is a good book for our list. (b. 1840-d. 1896.)

Irving Whitall Lyon, M.D. (b. 1840-d. 1896). The Colonial Furniture of New England; a study of the domestic furniture in the seventeenth and eighteenth centuries. Boston, Houghton, Mifflin & Co., 1891; 4to (.275 by .2 by .055); 12 + 285 p., 113 pl.; cloth, $10.00. Many interesting collections of photographs of colonial furniture have been published, all of which are quite worth while; but no one of them can be considered a standard publication like this fine work of Dr. Lyon. It is a national loss that nothing has been done with the

material which he collected for supplementary publication. The published price is no measure of the present value of this book.

Alvan Crocker Nye, architect. A Collection of Scale Drawings, Details, and Sketches of what is commonly known as Colonial Furniture, measured and drawn from Antique Examples. New York, William Helburn, 1895; fol. (.425 by .315 by .025); 5 p., 55 pl.; $14.00, unbound. This book supplements Lyon's fine history well. For illustration Mr. Nye preferred structural drawing in line, which is much more informing than photographs can be.

John Kimberly Mumford. Oriental Rugs. New York, Charles Scribner's Sons, 1900; 4to (.285 by .22 by .045); 15 + 267 p. 32 plates in colored photographs, 2 maps, 1 table; cloth, $7.50. The larger works on Oriental carpets, the only carpets about which there is any literature, are beyond our reach. Of the smaller books Mumford is the best for our list. It gives the kind of information about rugs which one most wishes to get, the different types, the conditions under which they are made and the like.

Ornament.

Owen Jones (1809-1874); architect. The Grammar of Ornament, illustrated by examples from various styles of ornament. London, Day & Son, lithographers to the Queen, 1856, fol. (.565 by .38 by .08), various paging, ill., 100 pl.; £19, 12s. Smaller edition, London, Day & Son, 1865; small fol. (.35 by .23 by .05); 158 p., 112 pl.; £5, 5s. It is a pity that there is no book on the history of architectural decoration as such, showing the dependence of the decorative forms upon the structural, and the part which decoration plays in the development of style. In our list, we must make the best of a few of the leading works on the historical development of ornament in general. The best of these is Owen Jones "Grammar," a masterpiece, so far as the colored lithography is concerned. For those who cannot afford the large edition the smaller one is a satisfactory book, practically identical with the larger edition, except in size.

Alexander Speltz: architect. Der Ornamentalstil; translated from the second German edition by David O'Connor; Styles of Ornament exhibited in Designs and arranged in Historical Order with Descriptive Text. A handbook for architects, designers, etc. Berlin and New York, Bruno Hessling, 1906; 8° (.245 by .175 by .035); 8 + 656 + 38p., ill., 400 pl.; cloth, $6.70. This is an excellent history of ornament. Its field is broad, covering the entire series from the earliest to the latest. It lacks, as all these books do, a proper discussion of the development of types.

Iron and Glass.

J. Starkie Gardner. Iron Work, Part I, from the earliest times to the end of the medieval period; Part II comprising from the close of the medieval period to the end of the eighteenth century, excluding English work. Published for the Committee of Council on Education; London, Chapman & Hall, 1896; 12mo (.2 by .135 by .015); 16 + 202 p., 134 ill.; cloth, 3s. each part. The works on iron are for the most part collections of photographs which furnish suggestions to designers but give little readable information. The little Starkie Gardner books, done by a famous English iron-master, are as useful for their text matter as for their illustrations.

N. H. J. Westlake. A History of Design in Painted Glass. London, James Parker & Co., 1881; small fol. (.355 by .27 by .02); 4 vols., ill.; cloth, $19.32 in 1892. American glass at its best is as fine as any. A good monograph on this subject would be well worth while. Treating of the fine old medieval glass there are several good manuals, but Westlake is the best. It contains a vast array of illustrations; none in color however.

Monuments.

William Brindley & W. Samuel Weatherley, F.R.I. B.A. Ancient Sepulchral Monuments; containing illustrations of over six hundred examples from various countries and from the earliest periods down to the end of the eighteenth century, with descriptive and general index, London, Vincent Brooks, Day & Son, 1887; fol. (.385 by .26 by .05); 50 p., 212 ill.; $16.00 in 1893. The making of sepulchral monuments is so mechanical in these days that one forgets how much of reverence and artistic sympathy has gone into this work. Brindley and Weatherley is an excellent reminder; a most complete history of monuments with delightful lithographic plates.

Office Books, Architectural Utilities.

The Orders, etc.

Pierre Esquié, architect of the French Government, former member of the French Academy of Rome. The Five Orders of Architecture—the casting of shadows and the first principles of construction, based on the system of Vignola. Boston, Bates & Guild Co., without date, 4to (.32 by .25 by .025); 24 p., 76 pl.; $5.00. The method of the Regola delli cinque Ordini d'Architettura of Jacopo Barozzio da Vignola, published about 1563, has been retained in a large number of books on the orders, called Vignolas. Of these manuals that of Esquié is one of the best, and the American edition is certainly most convenient. It includes the Greek orders.

Josef Buehlmann, Professor of Architecture in the Technische Hochschule, Munich. The Architecture of Classical Antiquity and of the Renaissance; with descriptive text, translated from the German of the second (revised and enlarged) edition by G. A. Greene. New York, Bruno Hessling, without date, small fol. (.48 by .325 by .03); 10 + 48p., 75 pl.; $18.00, unbound. Buehlmann was intended for consultation upon the drawing table, giving extremely well a vast amount of imformation about orders, details, and fine architectural examples which the busy draftsman needs constantly. The plates are well drawn and usually give sufficient measurements.

William R. Ware, LL.D., Professor of Architecture Columbia University. The American Vignola: Part I. The Five Orders. Boston, The American Architect and Building News Co., 1902. Part II. Arches and Vaults, Roofs and Domes, Doors and Windows, Walls and Ceilings, Steps and Staircases. Scranton International Textbook Co., 1906, small fol. (.32 by .24 by .015); Text, ill., pl.; cloth, $4.00. Professor Ware's Vignola derives its chief value from a simplified method of drawing the orders, and other details of the classic scheme.

Warming and Ventilating with Special Reference to Hospital Buildings—IV.

BY D. D. KIMBALL.

FOR large buildings and large rooms, such as church auditoriums, the rule last referred to is not as applicable and the exact requirements in heat units for the heating of the rooms should be determined.

Within a reasonable degree of accuracy the amount of heat lost through different building materials is known. The number of square feet of each kind of surface exposed to a temperature less than the room temperature should be determined, which, multiplied by the loss in heat units per square foot, per degree difference in temperature, and this result multiplied by the difference between the minimum outside temperature and the inside temperature desired (usually assumed to be 70°), will give the amount of heat lost through the walls, windows, etc., and which must be made up by heat obtained from the radiation. Add to this the amount of heat carried out with the vitiated air withdrawn by the ventilating system, and the total amount of heat to be supplied by the heating system is known.

The number of heat units lost per square foot of surface through different materials used in ordinary building construction is given in the table in next column.

If the room is one which is not to be ventilated the warming of the air within the room, and the leakage of air about the windows and through the walls must be provided for, the method of doing which varies among engineers, some adding a certain percentage to the losses determined as above, and others making provision for the heating of a certain amount of air, usually equal to one change of the cubic contents of the room per hour. The latter method seems to meet with the most favor, and Professor Carpenter's rule which has been quoted is based on this method. It has the advantage of being definite and it will be found entirely safe. In this case when using the heat unit method last referred to multiply the cubic feet of space in the room by the difference between the minimum outside and the maximum inside temperature desired (usually taken as 70°) and divide the result by 55 (approximately the number of cubic feet of air raised 1° by one heat unit) and the quotient will be the number of heat units required for the heating of the air in the room. Add this to the heat units lost through walls, windows, doors, etc., determined as above, and divide the sum by the heat units obtained from one square foot of radiating surface and the quotient will be the number of feet of radiation required for the warming of the room.

For direct steam radiation it is customary to assume that 250 heat units are obtained from each square foot of surface, excepting that in the case of wall coils and wall radiators 300 heat units per square foot may be counted upon. Low radiators or single column radiators will give slightly better results, reaching as high as 300 heat units per square foot. Radiators which are set in recesses or chases are twenty per cent to forty per cent less efficient

HEAT LOSSES THROUGH BUILDING MATERIALS

In Heat Units Per Square Foot Per Hour.

Kind of material.	Per deg. diff. inside and outside Temp.	For diff. in temperature of		
		60°	70	80
Single thickness of glass*	1.09	65.5	76.	87.
Double window	.46	27.6	32.2	36.8
Single skylight	1.16	70.	81.	93.
Double skylight	.48	29.	34.	39.
Pine doors 1″ thick	.41	25.	29.	33.
,, ,, 1¼″ ,,	.36	22.	25.	29.
,, ,, 1½″ ,,	.32	19.	23.	26.
,, ,, 2″ ,,	.27	16.	19.	22.
,, ,, 2½″ ,,	.23	14.	16.	18.
Oak ,, 1″ ,,	.58	35.	41.	47.
,, ,, 1¼″ ,,	.54	33.	38.	43.
,, ,, 1½″ ,,	.50	30.	35.	40.
,, ,, 2″ ,,	.43	26.	30.	34.
,, ,, 2½″ ,,	.39	24.	27.	31.
4″ Brick wall, unplastered	.52	31.	37.	42.
8″ ,, ,, ,,	.37	22.	26.	30.
12″ ,, ,, ,,	.29	17.	20.	23.
16″ ,, ,, ,,	.25	15.	18.	20.
20″ ,, ,, ,,	.22	13.	16.	18.
24″ ,, ,, ,,	.19	11.	14.	15.
28″ ,, ,, ,,	.16	10.	11.	13.
32″ ,, ,, ,,	.14	8.	10.	11.
4″ ,, ,, plastered one side	.49	29.	34.	39.
8″ ,, ,, ,, ,,	.36	22.	25.	29.
12″ ,, ,, ,, ,,	.28	17.	20.	22.
16″ ,, ,, ,, ,,	.24	15.	17.	19.
20″ ,, ,, ,, ,,	.21	13.	15.	17.
24″ ,, ,, ,, ,,	.18	11.	12.6	14.3
28″ ,, ,, ,, ,,	.16	9.6	11.2	12.8
32″ ,, ,, ,, ,,	.14	8.	10.	11.
4″ ,, furred, lath., plastered	.28	17.	20.	22.
8″ ,, ,, ,, ,,	.23	14.	16.	18.
12″ ,, ,, ,, ,,	.20	12.	14.	16.
16″ ,, ,, ,, ,,	.18	11.	12.6	14.3
20″ ,, ,, ,, ,,	.16	9.6	11.2	12.8
24″ ,, ,, ,, ,,	.14	8.8	9.8	11.2
28″ ,, ,, ,, ,,	.12	7.2	8.4	9.6
32″ ,, ,, ,, ,,	.11	6.6	7.7	8.8
4″ Sandstone, 8″ Brick, plast. inside	.31	19.	21.	25.
4″ ,, 12″ ,, ,, ,,	.25	15.	18.	20.
4″ ,, 16″ ,, ,, ,,	.22	13.	15.	18.
4″ ,, 20″ ,, ,, ,,	.19	11.	14.	15.
4″ ,, 24″ ,, ,, ,,	.17	10.	12.	14.
8″ ,, 8″ ,, ,, ,,	.29	17.	20.	23.
8″ ,, 12″ ,, ,, ,,	.23	14.	16.	18.
8″ ,, 16″ ,, ,, ,,	.20	12.	15.	16.
8″ ,, 20″ ,, ,, ,,	.18	11.	13.	14.
8″ ,, 24″ ,, ,, ,,	.16	10.	11.	13.
12″ ,, 8″ ,, ,, ,,	.26	16.	18.	21.
12″ ,, 12″ ,, ,, ,,	.21	13.	15.	17.
12″ ,, 16″ ,, ,, ,,	.19	11.	13.	15.
12″ ,, 20″ ,, ,, ,,	.17	10.	12.	14.
12″ ,, wall**	.45	27.	32.	36.
16″ ,, ,, ,,	.39	23.	27.	31.
20″ ,, ,, ,,	.35	21.	24.	28.
24″ ,, ,, ,,	.31	19.	22.	25.
28″ ,, ,, ,,	.28	17.	20.	23.
		25°	35	45
Ceiling, ordinary lath and plaster***	.62	15.5	21.7	27.9
,, lath, plaster, and double floor	.18	4.5	6.3	8.1
,, ,, ,, ,, single ,,	.26	6.5	9.1	11.7
Floors, single thickness, no plast.****	.45	11.3	15.7	20.
,, ,, ,, lath and plaster below	.26	6.5	9.1	11.7
,, double thickness, lath and plaster below	.18	4.5	6.3	8.1
,, double thickness, no plaster	.31	7.8	10.9	14.
4″ brick partition, plast. both sides	.43	10.8	15.1	19.4
8″ ,, ,, ,, ,, ,,	.33	8.3	11.6	14.9
12″ ,, ,, ,, ,, ,,	.26	6.5	9.1	11.7
Stud partition, lath. and plast. one side	.60	15.0	21.0	27.0
,, ,, ,, ,, ,, both sides	.34	8.5	11.9	15.3
Expanded metal and plaster 1½″ to 2½″ thick	.62	15.5	21.7	27.9
,, metal and plaster 2¾″ to 3¼″ thick	.50	12.5	17.5	22.5
		60	70	80
Roofs, flat, varies from .06 to	.10	6.	7.	8.
,, sloping, varies from .10 to	.18	10.8	12.6	13.6

*For perfectly tight windows. For ordinary windows add 6 to 12%, loose windows 12 to 20%. **For limestone walls increase 16%. ***Unheated space above assumed to be 40°. ****Unheated space below assumed to be 35°.

than above. Direct hot water radiation is ordinarily figured at 150 heat units per square foot.

If the room is one which is to be warmed and ventilated by indirect radiation the amount thereof may be found by multiplying the number of cubic feet of air required per hour by the difference between the inside temperature desired and the minimum outdoor temperature, and dividing the result by 55 as before; this gives the number of heat units necessary to warm the air required for ventilation and this should be added to the number of heat units lost through the walls, windows, doors, etc., determined as above. Then divide this total by the heat units obtained from one square foot of indirect radiation as given below, and the quotient will be the number of square feet of radiation required.

The heat units obtained per square foot of radiation will be approximately as follows, the temperature of the steam being 220° (two pounds pressure), the air supplied to the indirect radiator being at zero, and the air entering the room at 100° to 110°.

Register placed at floor (first)						280 heat units per square foot.					
,,	,,	8 to 10 feet above radiator				320	,,	,,	,,	,,	,,
,,	,,	16	,,	18	,,	,,	,,	440	,,	,,	,,	,,	,,
,,	,,	26	,,	28	,,	,,	,,	560	,,	,,	,,	,,	,,

If the air is heated by means of fan heater coils the efficiency of the surface is greatly increased because of the velocity at which the air passes through the coils which is customarily 1,000 feet per minute for warming and ventilating work of this character. The fan coil, which is ordinarily four or five sections deep, thus gives off from 1,500 to 1,600 heat units per square foot per hour. A shallow coil will give more and a deeper coil a less number of heat units per square foot per hour. To determine the size of the fan heater coil divide the total heat units required by the number of heat units obtained per square foot of surface in a fan coil. Allowance should be made for loss of heat in transmitting the air to the various rooms which is usually approximated at 5° to 8° drop in temperature for each 100 feet through which the air must pass before reaching the rooms.

Allowance must be made in determining the heat units lost through the walls, windows, etc., for the effect of the different exposures involved. If the radiation is figured as above recommended the following will be found sufficient in all but exceptional cases. For east and west exposures add ten per cent; for northwest, northeast, and north exposures add fifteen per cent; also add for buildings so located as to be badly exposed ten per cent; for buildings poorly built add fifteen per cent; for buildings heated during the daytime only and badly exposed add thirty per cent; for buildings intermittently heated add twenty per cent to fifty per cent.

With the total heat units required for warming and ventilating known, and from which the radiation has been determined as above, the boiler capacity may now be exactly determined.

The capacity of the heating boiler depends largely upon its grate area, and to some extent upon its heating surface, the value of which, however, is somewhat dependent upon its location. The grate area required depends upon the heating value of the fuel to be used. Anthracite coal contains about 14,000 heat units per pound of combustible, but the amount of ash and non-combustible matter in the coal will reduce the heating power to about 13,000 heat units per pound of coal as ordinarily used. Coke has about the same heat value and bituminous coal has slightly less, although in large plants it can be burned with quite as satisfactory results, providing sufficient chimney draft is available.

The efficiency of the boiler will depend upon its size, design, draft, etc. Sectional boilers vary in efficiency from approximately fifty per cent in small boilers to sixty per cent in the large boilers, while horizontal tubular boilers, well managed, will operate at from sixty-five per cent to seventy-five per cent efficiency. Under these conditions, therefore, approximately 7,000 to 9,500 heat units per pound of coal are delivered from boilers such as might be used in hospitals, the exact amount depending upon the kind and size of boiler used.

The size of the grate should be determined by dividing the total heat units required as determined in figuring the radiation, as previously explained, by 7,000 to 9,500 heat units, the exact figure depending upon the type of boiler selected. Not over 8,500 would be used in the case of a sectional boiler, and usually less. The quotient will be the pounds of coal which must be burned per hour to perform the heating work. This amount divided by the pounds of coal which may be burned per square foot of grate area per hour will determine the area of the grate. The pounds of coal to be burned per square foot of grate per hour depend on the size of the plant or kind of boiler, and the frequency of attendance. In small sectional boilers with 1 to 7 square feet of grate area from 3 to 5 pounds of coal may be burned per square foot of grate area per hour, and 7,000 heat units per pound of coal may be figured, while in sectional boilers having 7 to 13 square feet of grate area 5 to 6 pounds may be consumed and 8,000 heat units per pound of coal may be figured, and in large sectional boilers containing 13 square feet of grate area and above 6 to 7 and even 8 pounds of coal per square foot per hour may be burned without difficulty and 8,500 heat units per pound of coal burned will be secured.

In selecting sectional boilers make use of one which has not less than the above amount of grate surface and a manufacturer's rating not less than twenty-five per cent in excess of the radiation to be connected thereto. If part of the radiating surface is indirect radiation its equivalent in direct radiation figured on the basis of heat units obtained per square foot of radiation per hour should be allowed for. Ordinarily in the case of indirect radiations connected to registers in the first or second floor an addition equal to seventy-five per cent of the number of square feet of indirect radiation should be made, while in the case of direct-indirect radiation an allowance equal to one third the amount thereof should be made. If the boilers and mains are not covered with efficient insulating material the square feet of surface therein should be measured and added to the amount of radiation connected to the boiler before determining upon the size thereof. A boiler which is too small requires too frequent attention and is expensive to operate.

In the case of a tubular boiler (water tube or fire tube) used for heating purposes the grate area is to be determined in the same manner as in the case of sectional

boilers, except that a greater efficiency in coal consumption may be figured. From 8,500 to 9,500 heat units per pound of coal may be assumed, the less amount in the smaller sizes and the larger amount in the larger sizes. In the case of this type of boiler it is also necessary to determine the amount of heating surface in the shell and tubes of the boiler, which determines the horse power or capacity of the boiler. In the usual low pressure heating plant with tubular boilers 36 inches in diameter, up to 54 inches in diameter, without a night engineer, figure from 5 to 6 pounds of coal per square foot of grate surface and 2,000 heat units per square foot of boiler heating surface; in boilers of larger size figure 8 to 9 pounds of coal burned per square foot of grate and 2,200 heat units per square foot of boiler heating surface, and in larger heating plants with constant attendance figure 10 to 12 pounds of coal burned per square foot of grate area and 2,600 heat units per square foot of boiler heating surface. In large central plants it is quite possible to burn 15 pounds of coal per square foot of grate area with natural draft, while obtaining 3300 heat units per square foot of boiler heating surface.

In the above manner is determined the amount of grate area and heating surface which determines the capacity of the boiler. The dimension of a horizontal tubular boiler which will contain the required amount of heating surface may be found in any first class tubular boiler manufacturer's catalogue. The catalogue of the D. M. Dillon Steam Boiler Works, of Fitchburg, Mass., will be found especially valuable in this connection.

In hospital buildings particularly it is not wise to install only one boiler. If the plant is small and one boiler will carry the entire load a second boiler should be installed as a spare boiler to be available in case of a breakdown and to make possible the frequent cleaning of the boiler in use. In larger plants it will be wiser to install three or more boilers, one of which shall always be a spare boiler.

The sectional boiler is usually set without masonry except that it be mounted on one or two courses of brick to give a deeper ash pit, which is often desirable, in which case these bricks should be laid in cement mortar so as not to affect the draft. This type of boiler should be thoroughly covered with a high grade of asbestos which may take the form of 1½ inch asbestos cement felting, wired on and finished hard and smooth.

The tubular boiler is always set in brick work laid on concrete footings 12 inches to 24 inches in depth, depending upon the size of the boiler and character of the soil. The outside walls should be double walls with 2 inches air space between, the outer being 8 inches and the inner or supporting walls being 12 inches thick at the point where the boiler rests on the wall. It is customary to taper the inside face of the wall from the grates to the point where the boiler is supported so there shall be 2 inches of space between the boiler and the wall until the point of support is reached, at which point the wall is closed in on the boiler or nearly so. The grates of these boilers are placed 24 inches to 27 inches above the floor and the boilers are placed 24 inches to 27 inches above the grates, the less dimension being used with the small sizes and the greater dimension with the larger sizes. There should be a space between the rear head of the boiler and the rear wall of the setting of from 20 inches to 24 inches, the rear walls being two 8-inch walls with 2 inches air space between, as in the case of the side walls. Where two or more boilers are set in battery the dividing wall is usually 16 inches to 24 inches in width at the boiler level, increasing with the size of the boiler as above, and tapering as in the case of the inside side walls. In heating work it is customary to line the front and sides of the fire box, up to the supporting lugs and back to a point 12 inches back of the rear of the bridge wall, also the bridge wall and rear wall of the setting with a high grade of fire brick. In large heating plants in constant use the entire combustion chamber back to the rear wall may well be lined with fire brick.

With the amount of radiation and the size of the boilers found as above, the size of the pipes connecting these two important elements of the heating system becomes important. Many formulas are available, the most of them being too elaborate for practical use in small work, as they give consideration to the steam pressure, length of pipe, number of fittings, etc. For buildings of the average size heated with 2 to 4 pounds steam pressure, in which the length of the pipes does not exceed 100 feet, or even 200 feet, the following table has been found to answer every purpose:

PIPE SIZES FOR SUPPLY AND RETURN MAINS.

Not over 100 feet long. Steam pressure 2 to 4 lbs.

Square Feet of Radiation.	Supply.	Return.
0 to 50	1″	¾″
50 ,, 100	1¼″	1″
100 ,, 150	1½″	1″
150 ,, 300	2″	1¼″
300 ,, 550	2½″	1¼″
550 ,, 1000	3″	1½″
1000 ,, 1500	3½″	1½″
1500 ,, 2000	4″	2″
2000 ,, 2500	4½″	2″
2500 ,, 3600	5″	2″
3600 ,, 5000	6″	2½″
5000 ,, 7000	7″	2½″ or 3″
7000 ,, 10000	8″	3½″

RADIATOR CONNECTIONS.

Direct Radiators (Steam).

2 Pipe Connection.			1 Pipe Connection.	
Sq. Ft. of Radiation.	Sup.	Ret.	Sq. Ft. of Radiation.	Supply.
0 to 48	1″	¾″	0 to 60	1¼″
48 ,, 96	1¼″	¾″	60 ,, 100	1½″
96 up	1½″	1″	100 up	2″

Direct-Indirect Radiators.			Indirect Radiators.		
Sq. Ft. of Radiation.	Sup.	Ret.	Sq. Ft. of Radiation.	Sup.	Ret.
0 to 36	1″	¾″	0 to 36	1″	¾″
36 ,, 72	1¼″	¾″	36 ,, 72	1¼″	1″
72 up	1½″	1″	72 ,, 120	1½″	1″
			120 up	2″	1¼″

Direct Hot Water.		Indirect Hot Water.			
Sq. Ft. of Rad.	Pipe.	Sq. Ft. of Rad.	Pipe.	Sq. Ft. of Rad.	Pipe.
0 to 40	1″	0 to 56	1¼″	235 to 405	3″
40 ,, 72	1¼″	56 ,, 80	1½″	405 ,, 585	3½″
72 up	1½″	80 ,, 150	2″		
		150 ,, 235	2½″		

Runouts to direct and direct-indirect radiators to be same size as radiator tappings, except that when they exceed 5 feet in length use next larger size pipe.

Riser sizes may be determined from table prepared by Mr. William G. Snow, on next page.

CAPACITY IN SQUARE FEET DIRECT RADIATION.

Pipe Sizes.	1 Pipe Up Feed.	2 Pipe Up Feed.
1″	50	70
1¼″	90	130
1½″	130	190
2″	210	330
2½″	300	570
3″	460	1020
3½″	620	1490
4″	800	2000

Down feed risers will readily carry twenty-five per cent more radiation.

To secure quiet results it is well that no supply riser should be less than 1¼ inch.

Return risers may be one size smaller than supply up to 1½ inches, two sizes smaller up to 2½ inches, and three sizes smaller above 2½ inches. In general a pipe used as a return will serve eight times as much radiation as it will supply.

Editorial Comment and Miscellany.

CLEANING BRICK BUILDINGS.

WRITING in *The Builders' Journal*, London, Mr. A. B. Searle says that a very popular means of cleaning brick buildings in this country is by the use of hydrochloric acid, and provided the acid is not too strong this method may be quite satisfactory. For many purposes acetic acid is more satisfactory than hydrochloric acid, as it is equally effective in its action on the dirt without having so corrosive an effect on the bricks. It is more expensive, but owing to its non-corrosive action buildings on which it is used remain clean longer than when the stronger "spirits of salt" is employed.

DETAIL BY O. C. WOLF, ARCHITECT. New York Architectural Terra Cotta Company, Makers.

The amount of acid and water mixture required will vary somewhat with the care and skill with which it is applied, but will average about 4 square yards per gallon of mixture with ordinary care, and costing for acid about a farthing a square yard, with acetic acid, and half to one third of this amount for common hydrochloric acid.

DETAIL BY F. B. PYLE, ARCHITECT. Conkling-Armstrong Terra Cotta Company, Makers.

When acid is used to clean the face of a building the latter should first be washed over with clean water to remove all the dirt which can be taken off by this means. The surface is next treated with the weak acid — a hard brush, but not one of metal, being used — and finally the building is washed over with clean water to remove any material which has been loosened but not actually removed by the acid. This final washing may, if desired, be carried out by means of a powerful jet of water, care being taken to work from the top of the building downwards, so as to prevent all accumulation of unsightly spots caused by the "creeping" of the dirt, which always occurs when the building is played on irregularly with a hose.

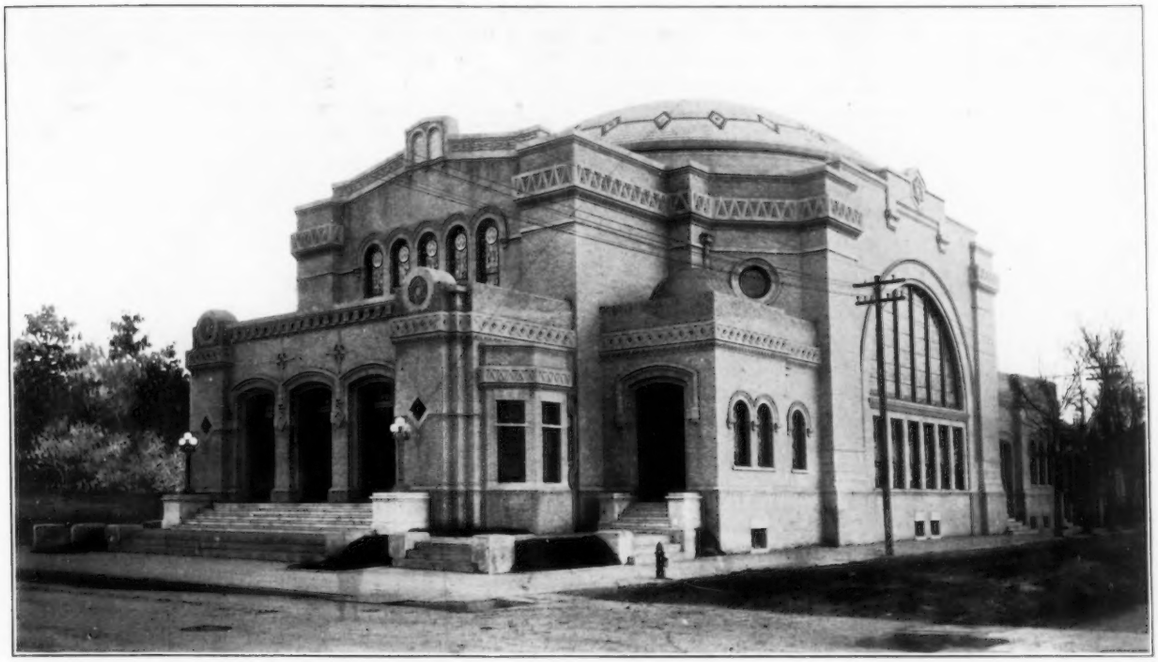
Soft soap has been tried with much success, especially when it has been dissolved in thirty-six to forty times its weight of warm water (1 pound of soap in 4 gallons of water) and used whilst still warm. Apparently the most efficient cleaning is obtained by treating the building with clean water, then with the soap solution applied with a hard brush, and finally washing down with water just as was recommended above when acid is used.

Soap has little or no action on clean brickwork or stone, and its effect on soot and similar matters of a greasy nature is far more intense than that of any acid, so that when it is used buildings of either red or buff bricks rapidly regain their original color, unless the cleaning process has been so long delayed that nothing can ever remove the dirt from the bricks. Care must be taken to wash off thoroughly all the soap by means of a thorough playing with a hose or by the more expensive washing over with clean water, or discoloration will be produced. In actual cost the use of soft soap in the manner described works out at practically the same as for acid.

In buildings where the dirt is more of a dusty than a sooty character, it will not usually be necessary to employ any special cleansing material, as a powerful spray of water — such as that from a fire-engine — will usually clean the building sufficiently, providing that the surface of the bricks is reasonably close and dense.

In cleaning terra cotta work, special care must be taken that the surface is not destroyed, as much of the modern terra cotta has a finished or dense face, but an open or porous

DETAIL EXECUTED BY SOUTH AMBOY TERRA COTTA COMPANY.



TOURO SYNAGOGUE, NEW ORLEANS, LA.
Built of gray brick, made by Hydraulic-Press Brick Company, St. Louis, Mo.
Emile Weil, Architect.

body, and if once the face is removed it will be almost impossible to keep the building clean.

For buildings which are disfigured by a whitish encrustation, technically known as efflorescence or "scum," the use of very weak hydrochloric acid is almost essential, though even this does not always prove a complete remedy. The causes of "scum" are so numerous and complicated that it is difficult to provide any single means of removing this unsightly material.

Scum is chiefly caused by soluble salts in the bricks, which are dissolved when the latter become wet with rain, and as the water dries out it carries the salts to the surface of the bricks and there deposits them. If the scum were only thicker, it would be best to remove it by scraping the walls gently, taking care not to scratch the bricks, but this is not usually practicable, and the least harmful method is to brush the defective surface with a moderately hard-dry brush, when the bricks are thoroughly dry. Should this not prove effectual after several times, the surface may be washed over with a little weak acid, and then with water, the disadvantage of this latter method being that it may cause the formation of a larger proportion of soluble salts (through the action of the acid on some of the constituents of the brick), and the remedy may thus prove to be worse than the disease. The same, in a lesser degree, is true of repeated scrubbing of the wall with a wet brush and water.

The greater part of the scum which disfigures so many buildings is really due to faulty material or to the use of impure water in manufacture, and only in very few instances is it due to the absorption of soluble salts from careless storage of the finished bricks.

NORMAL SCHOOL, MILWAUKEE, WIS.
Faced with wire cut dark red brick, made by Western Brick Company.
Van Ryn & De Gelleke, Architects.

CHIMNEY "THROWING."

MR. W. LARKINS, well known as a "Steeple Jack," who carried out the difficult and dangerous work of the repair of the Nelson Statue and Column in Trafalgar Square, describes in *The Builder*, London, his recently adopted method of "throwing" large chimneys, and regulating the direction of their fall by means of a carefully measured cut into one side of the base of the chimney. Mr. Larkins says:

"The height ascertained, the pitch marked out with ropes, the center of the shaft is taken

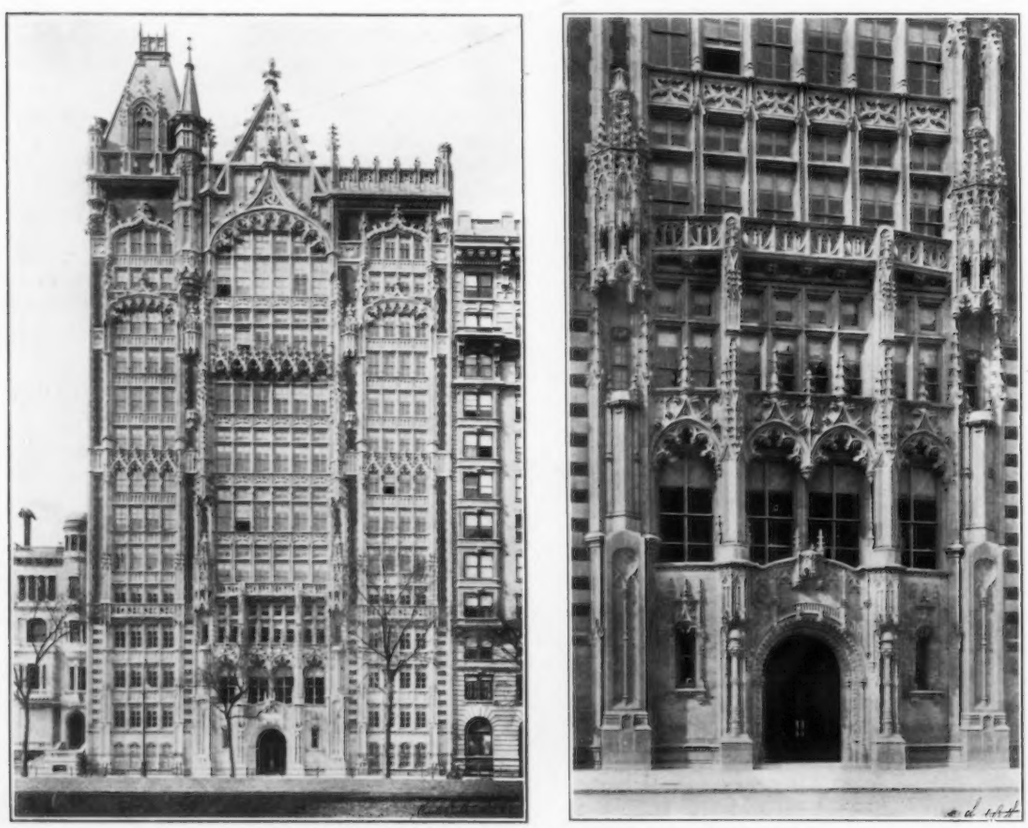
facing the space where the fall is desired. The circumference is next taken; then, from the center, the half of the diameter is taken each way; this gives the exact half of the chimney facing the place of fall. Then marks are made exactly at each foot on each side of the center line, until the halfway mark is reached. Then, commencing at center-mark, each foot-mark is numbered, the number corresponding on each side of the center-mark until the halfway mark is reached This ensures the cut being made accurately; as soon as the man on one side reaches, say, No. 4, he calls out to the man on the other side, to enable both to keep together. If the cut was, say, 6 inches out, it would mean the throw to be several feet out. If there is a good stretch of ground for the shaft to fall, a deep cut will throw the shaft like a tree, in fact, until nearly reaching earth. This causes the bricks to 'stretch' out half the length of shaft over its height; but if space is limited a thinner cut is made, which causes the opening to meet quicker, thus breaking the shaft up in its fall, and dropping it in half its own height.

CENTRAL POWER STATION, NAVY YARD, CHARLESTON, S. C.
Built of light buff brick, made by Columbus Brick & Terra Cotta Company.

"When the half-way mark comes over a flue the arch must be propped up, or the tremendous weight of the shaft, coming on the arch as it commences to heel, will cause the arch to collapse, thus changing the line of fall and causing a disaster if houses or workshops are in the way.

"A strict rule to follow is never to pass in front of the opening, and keep a sharp lookout for signs of collapse; the first sign is the opening of a joint of the brickwork opposite the upper edge of the cut. A long disused shaft, or a rotten one, collapses when only one third is cut; a well-built or dry shaft often does not fall even when cut to the halfway mark.

"This method is the cheapest. The old method, to prop with timber and burn



STUDIO BUILDING, 44 WEST 77TH STREET, NEW YORK CITY.
Entire front of building of "limestone" terra cotta, made by Atlantic Terra Cotta Company.
Harde & Short, Architects.

away, takes a great deal of labor, apart from timber props, inflammable material (oil, several casks of paraffin, etc.); also risk of fire to surrounding property. This cutting method costs only a trifle; although I must say I am the only steeple jack who adopts it — it being considered risky; but I accept all liability as to damage to property, etc.

"The highest chimney I have 'thrown' in this way was 300 feet high, and weighed over 3,000 tons; moreover, the shaft was 'tackled' by several other steeple jacks to demolish piecemeal, but they left the work after six weeks, during which time they made little impression on the chimney, so I obtained the contract to 'throw,' which was an entire success.

"The two shafts which I have thrown since occupied three and a half hours, at a much lower tender for the cost of the operation than any other submitted."

DETAIL BY TOLEDANO & WOGAN, ARCHITECTS.
Northwestern Terra Cotta Company, Makers.

ON JUNE 12TH a jury in Justice Amend's part of the New York Supreme Court rendered a verdict of $5,002.65 in favor of Abner J. Haydel, the architect who drew the plans for the country house of Charles A. Gould, ex-commodore of the Atlantic Yacht Club. Gould agreed in 1904 with the architect that the latter should design a "castle" to cost $150,000; and after accepting the plans, repudiated his obligation to pay the $8,000 which the architect claimed the drawings cost.

DETAIL BY SCHWARTZ & GROSS, ARCHITECTS.
New York Architectural Terra Cotta Company, Makers.

IN GENERAL.

F. E. Fagerquist, architect, has removed his offices to 124 Indiana Building, Oklahoma City, Okla. Manufacturers' catalogues desired.

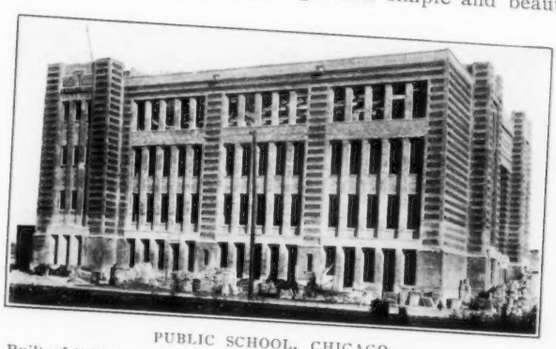
James H. Ritchie, architect, has removed his offices from 110 State St. to 8 Beacon St., Boston.

Nichols & Hughes have opened offices for the practice of architecture in the V. B. Building, Dayton, Ohio. Manufacturers' catalogues and samples desired.

The Guastavino system of tile vaulting was employed in all the work illustrated in connection with the article "Interesting Examples of the Use of Burnt Clay in Architecture" published in this number. The architectural terra cotta was supplied by the Atlantic Terra Cotta Company.

The Combination Life Rail and Surface Drainage Tile, made by the American Enameled Brick and Tile Company, will be used in the following new work: Plunge for Mount Hermon School for Boys, Northfield, Mass., Parish & Schroeder, architects; plunge in house for C. K. G. Billings, Esq., New York City, Guy Lowell, architect. Over one million of their regular enameled bricks will be used in the Buffalo Water Work plant, Douglas County, County Court House at Omaha, large bakery at Chicago, and two new apartment houses in New York.

The German Lutheran Church, New York, G. W. Conable, architect, illustrated on page 166 of this issue, was built of brick manufactured by the Kreischer Brick Manufacturing Company, 119 East 23d St., New York. The architectural terra cotta was supplied by the South Amboy Terra Cotta Company.



PUBLIC SCHOOL, CHICAGO.
Built of "Shawnee" brick, made by Ohio Mining & Manufacturing Company, Thomas Moulding Company, Chicago, Agents.
Dwight H. Perkins, Architect.

NEW BOOKS.

Craftsman Homes. The two hundred and twenty-six pages carry over two hundred illustrations, showing among other interesting features: "A House with Outdoor Living Room;" "A Sleeping Porch;" "A 'Craftsman Farm' House;" "Craftsman Home for Two Families;" "A Craftsman Open-Air Dining Room;" "A Hooded Pergola;" "A Simple Water-Garden," and endless suggestions for the building, furnishing, and fitting of houses, and the arranging of gardens simple and beautiful to surround them. New York, The Craftsman Publishing Company.

Building Construction and Superintendence. By F. E. Kidder, C. E. Revised and enlarged by Thos. Nolan, M.S., A.M., Fellow of the American Institute of Architects, Assistant Professor of Architecture University of Pennsylvania. Part I., ninth edition, revised, Mason's Work. 628 illustrations; 985 pp. One 8vo vol. Cloth. Price, $6. New York, William T. Comstock.

Asphalts, Their Sources and Utilizations. Asphalt for dustless roads, recent improvements in asphalt industries, together with addenda treating on general waterproof construction. By T. Hugh Boorman, Civic Engineer and Asphalt Expert. New York: William T. Comstock. One 8vo vol. Cloth, $3.00.

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COMPETITION FOR A BRICK HOUSE.

COST NOT TO EXCEED $10,000.

FIRST PRIZE, $500. SECOND PRIZE, $250. THIRD PRIZE, $150. FOURTH PRIZE, $100. MENTIONS.

PROGRAM.

The problem is a house with walls built of brick. Porches, verandas, or piazzas may be in part or wholly of brick or wood.

The cost of the house (exclusive of the land) including heating—equipment complete; plumbing—including all fixtures; gas piping and electric wiring—with fixtures, is not to exceed $10,000.

Designs which in the opinion of the jury call for a house which would cost more than the amount named to execute will not be considered.

The plan should provide accommodations for a family of five—three adults and two children—and at least one servant. There are no restrictions as to size, shape, or style of house—except the cost—nor the size, shape, or location of lot.

The particular object of this Competition is to obtain designs for a BRICK HOUSE of moderate cost. It is especially desired that the treatment of the exterior shall show the possibilities in obtaining charming but restrained effects by the use of bond and jointing and pattern. The BRICK HOUSE is rich in precedent, and the material, whether considered from the esthetic or the practical standpoint, meets in the fullest measure the demands put upon it. To summarize; —the Competition calls for A CHARMING BRICK HOUSE OF MODERATE COST.

CONSTRUCTION.

The methods usually employed in the construction of brick walls may be followed, except that the walls are to be wholly of brick and of sufficient thickness to safely carry the load. The program does not call for a fireproof house, although that form of construction is not objected to. The choice of brick is left to the designer.

DRAWINGS REQUIRED.

On one sheet a pen and ink perspective, without wash or color, drawn at a scale of four feet to the inch. Also plans of first and second floors at a scale of eight feet to the inch. In connection with the plan of the first floor show as much of the arrangement of the lot in the immediate vicinity of the house as space will permit.

On another sheet, at the top, the front elevation drawn at a scale of eight feet to the inch,—and below the elevation, a sufficient number of details to properly show the brickwork and the special features of the design,—drawn at half inch scale in black ink without wash or color. Sections shown are to be cross-hatched in such manner as to clearly indicate the material, and floor plans are to be blocked in solid.

The size of each sheet is to be exactly 24 inches by 18 inches. Strong border lines are to be drawn on both sheets one inch from edges, giving a space inside the border lines 22 inches by 16 inches. The sheets are not to be mounted.

Each set of drawings is to be signed by a *nom de plume* or device, and accompanying same is to be a sealed envelope with the *nom de plume* on the exterior and containing the true name and address of the contestant.

The drawings are to be delivered flat, or rolled (packaged so as to prevent creasing or crushing), at the office of THE BRICKBUILDER, 85 Water Street, Boston, Mass., on or before Sept. 15, 1909.

Drawings submitted in this Competition are at owner's risk from time they are sent until returned, although reasonable care will be exercised in their handling and keeping.

The designs will be judged by three or five well-known members of the architectural profession.

In making the award the jury will take into account the fitness of the design in an artistic sense to the material employed; the adaptability of the design as shown by details to the practical constructive requirements, and the excellence of the plan.

Drawings which do not meet the requirements of the program will not be considered.

The prize drawings are to become the property of THE BRICKBUILDER, and the right is reserved to publish or exhibit any or all of the others. The full name and address of the architect will be given in connection with each design published. Those who wish their drawings returned, except the prize drawings, may have them by enclosing in the sealed envelopes containing their names ten cents in stamps.

For the design placed first there will be given a prize of $500.
For the design placed second a prize of $250.
For the design placed third a prize of $150.
For the design placed fourth a prize of $100.

This Competition is open to everyone. The prize and mention drawings will be published in THE BRICKBUILDER.